K. WARMING.

AUXILIARY BOTTOM.

APPLICATION FILED JAN. 12, 1914.

1,157,132. Patented Oct. 19, 1915.

Fig 1

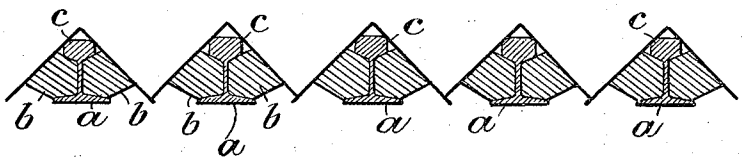


Fig 2

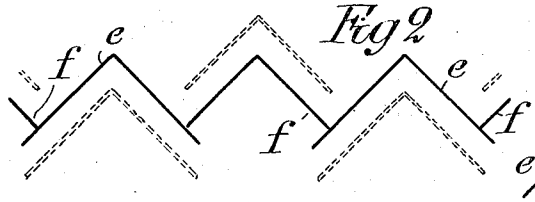


Fig 3

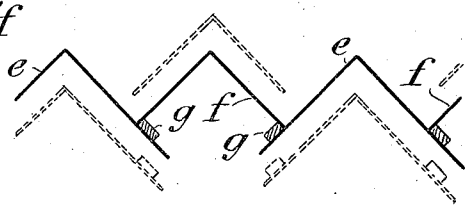


Fig 4

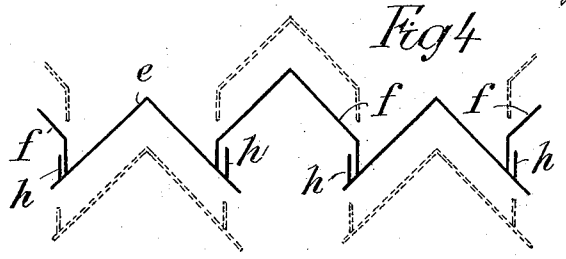


Fig 5

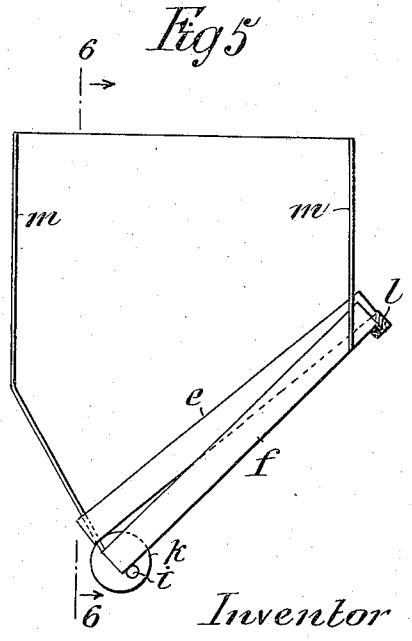
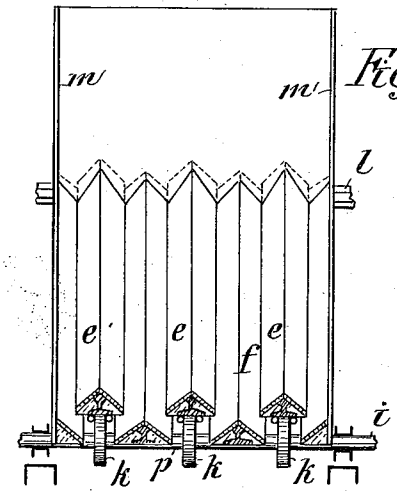


Fig 6



Witnesses

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AUXILIARY BOTTOM.

1,157,132. Specification of Letters Patent. Patented Oct. 19, 1915.

Application filed January 12, 1914. Serial No. 811,780.

To all whom it may concern:

Be it known that I, KAI WARMING, a subject of the King of Denmark, residing at Copenhagen, Denmark, have invented certain new and useful Improvements in Bottoms or Auxiliary Bottoms for Use in Reservoirs, Silos, Reaction-Chambers for Superphosphate, and the like, of which the following is a full, clear, and exact description.

The invention relates to a bottom or auxiliary bottom for use in reservoirs, silos, and the like, which are to be emptied at foot in such a manner that the emptying can be controlled so as to take place successively.

Pulverent substances such as ground cement and the like possesses a certain internal coherence, especially so the undermost parts which have been compressed through the weight of the material resting on the same, and such substances are sometimes packed so firmly that they will not fall down even if part of the bottom on which they have rested be removed, and it then becomes necessary to make the material fall down by blows on the container or by hacking down the material. Hereby it often occurs, however, that a considerable quantity of the material falls down at a time, and it is impossible to cause the material to fall down in a regular controllable current.

The bottom forming the object of the present invention, consists of gratebars or girders, each or some of which are movable up and down in relation to the adjacent bars, and which when all of them in a certain position are at the same level, overlap each other with their edges so as to form a completely or almost completely closed bottom.

In the drawing annexed Figure 1 shows a vertical section through a number of special kind of grate bars forming a bottom according to the present invention, Figs. 2–4 diagrammatically other modifications. Fig. 5 shows a somewhat diagrammatic section through a container provided with a bottom of gratebars according to Fig. 1, and Fig. 6 a section on line 6—6, Fig. 5.

In the modification shown in Fig. 1, which is meant for carrying a considerable load, rails *a* are used for the grate bars. Along the said rails wooden bars *b* of the shown profiles are fastened, which serve for supporting roof-shaped plates *c* bent at an angle which is dependent on the angle of sliding of the substance for which the bottom is to be used. In the shown position of the parts all of the grate-bars are at the same level and form an almost completely closed surface.

When some of the grate-bars are moved out of level with the remainder of them openings will be formed between the bars which will enable pulverulent material resting on the bottom formed by the said bars to slide down the sloping surfaces of the bars and thus pass through the bottom. The manner in which the said bars are moved may be different according to the circumstances, the nature of the material, etc. The bars which are overlapping cannot be moved past each other but the bars *f*, Fig. 2 may be moved upward until the position shown on dotted lines or the bars *e* may be moved downward or the bars *f* and the bars *e* may all be moved away from the position shown in full lines in order to give way for the passage of the material resting on the bottom.

The lists *g* shown in Fig. 3 are fastened to the grate-bars *e* as shown in order to secure tightness and thus prevent the unintended passage of a fine pulverulent substance. In Fig. 4 is for the same purpose shown gutter shaped seals *h* on the plates *e* for the same purpose and a bottom formed by such interlocking plates is under any circumstance powdertight. A bottom formed of any of the shown forms of grate-bars may either be arranged horizontally or in some cases more or less obliquely.

In Figs. 5 and 6 is illustrated by way of example a container *m* having an obliquely arranged bottom formed by grate bars each second of which is movable up and down while the remainder are fixed. One end of the grate bars *e* and *f* are suspended on a fixed support *l* formed by a rail or the like and the other ends of the bars *f* are resting on a shaft *i* journaled at the lowermost edge of the container while the ends of the bars *e* are resting on the circumference of eccentrics *k* keyed on the said shaft. When rotated the eccentrics will cause the bars *e* to be alternately lifted to the position shown in Fig. 6 and lowered until contact with the bars *f* and at each revolution of the shaft *i* part of the material resting on the bottom will fall down between the grate-bars *e* and *f*. By revolving the shaft *i* at different

speeds the passage of the material through the bottom may easily be controlled.

I claim:—

1. A bottom for emptying containers for comminuted materials comprising a plurality of substantially inverted V-shaped bars adapted to support the said materials, means for moving certain of the said bars up and down, each second of the said bars overlapping the adjacent bars so as to form in a certain position a closed bottom.

2. A bottom for emptying containers for comminuted materials comprising a plurality of substantially inverted V-shaped bars adapted to support the said materials, means for moving certain of the said bars up and down, each second of the said bars overlapping the adjacent bars and closing means arranged on the latter adapted to coact with the said overlapping bars.

In witness whereof, I have subscribed my signature, in the presence of two witnesses.

KAI WARMING.

Witnesses:

AGGO BLOM,

FRITZ FREDERICKSEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."