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Reifenhaeuser et al.

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[54] **COMPRESSING APPARATUS HAVING A PORTIONING DEVICE**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **100/97,** 100/215, 100/218, 100/245, 100/250, 222/450

[51] **Int. Cl.** **B30b 15/08**

[58] **Field of Search** 83/147; 425/256, 258, 352, 425/412, 431, 296, 297; 17/32; 222/80, 444, 450; 100/215, 96, 97, 245, 249, 250, 218

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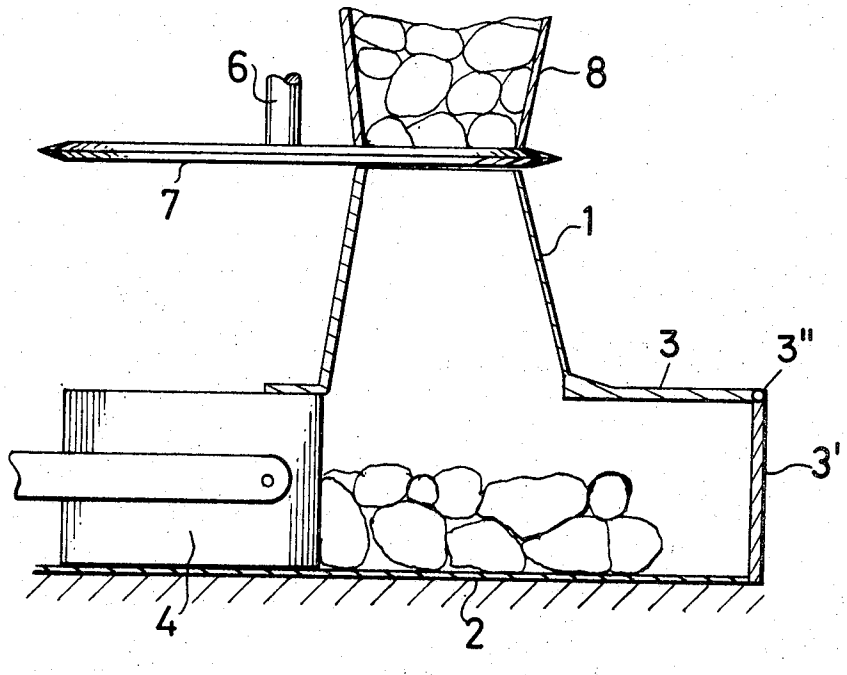
[57] **ABSTRACT**

The present portioning device has a metering chamber and a compression chamber in which the material metered in the metering chamber is compressed. An intermediate chamber having a volume larger than the metering chamber is arranged for receiving the yet uncompressed but metered portion to locate such portion for compressing transfer into the compression chamber.

6 Claims, 5 Drawing Figures



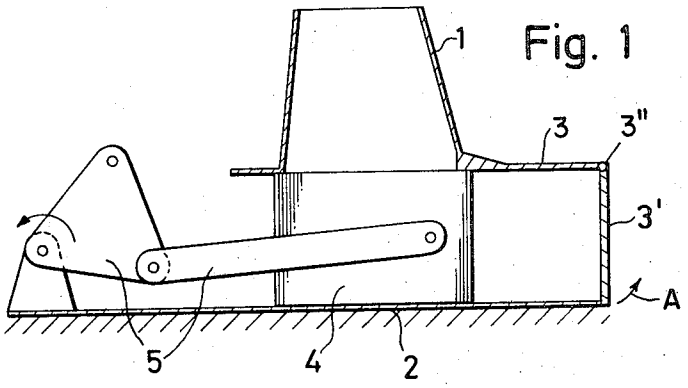


Fig. 1

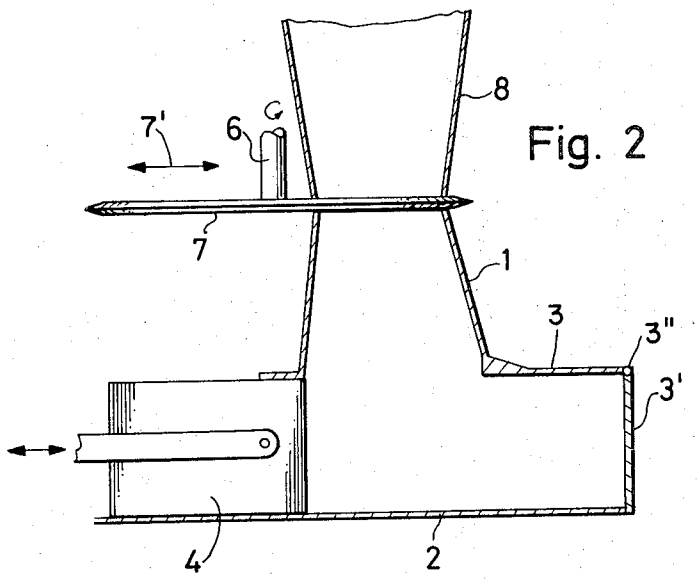


Fig. 2

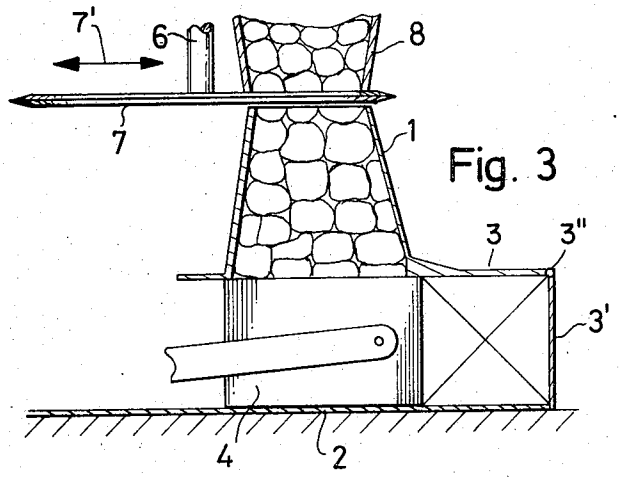


Fig. 3

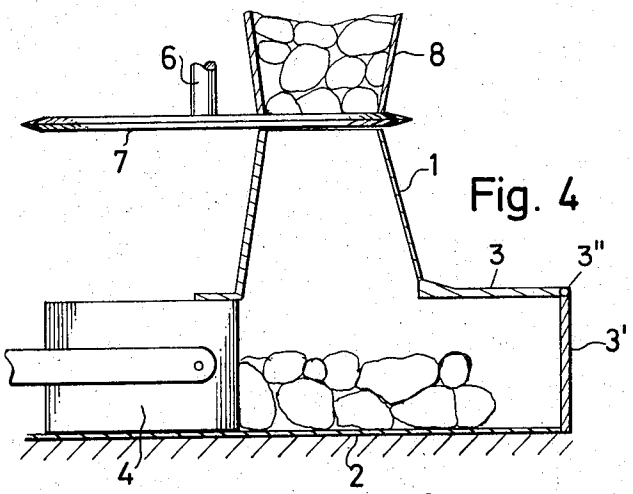


Fig. 4

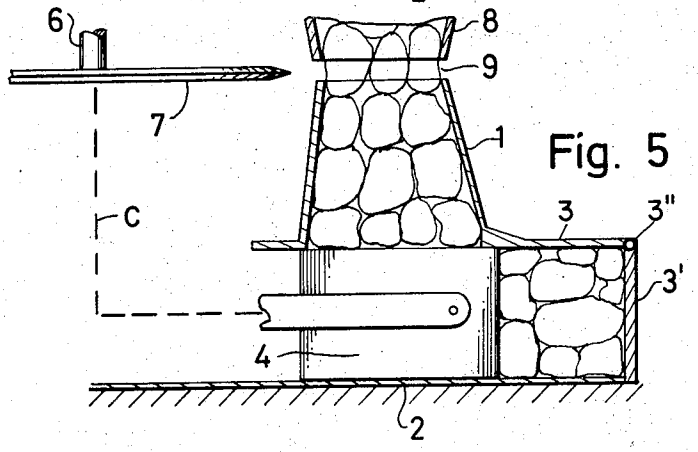


Fig. 5

COMPRESSING APPARATUS HAVING A PORTIONING DEVICE

BACKGROUND OF THE INVENTION

The present invention relates to a device for portioning goods, especially materials to be compressed, for example, prior to packaging.

A known slicing and cubing apparatus for portioning material such as food, for example meat, has a box-like magazine and means for cutting the material into slices or cubes, as well as an inlet opening closable by a cover. The cover comprises a knife bar which is reciprocable and/or tiltable in the plane of the inlet opening. The portioning is accomplished by separating the portion of the material accumulated above the plane of the inlet opening from the portion below that plane within the magazine while simultaneously closing the magazine. The goods are subsequently compressed by displacing one wall of the closed magazine for reducing the volume of the magazine.

A substantial drawback of this known device is seen in that the next portioning operation can begin only after compression of the previous portion in the magazine and after emptying the magazine. Another drawback is due to the high load placed upon the knife bar serving as a cover for the magazine. Depending on the consistency of the material, the knife bar tends to be bent in its center during the compression of the material since the bar is supported only at both ends.

OBJECTS OF THE INVENTION

In view of the above, it is the aim of the invention to achieve the following objects singly or in combination:

to overcome the above drawbacks, especially to provide a device for portioning materials such as food stuffs which will work more efficiently;

to provide a device for portioning materials which operate faster than prior art devices by permitting the metering of a new amount of material just as soon as a compression member closes a metering chamber; and

to relieve the cutting member or knife bar from loads caused by the compression of the material.

SUMMARY OF THE INVENTION

According to the invention there is provided a portioning device having a metering chamber and a compression chamber interconnected by an intermediate chamber having a volume equal or larger than the metering chamber and receiving the uncompressed material from the metering chamber for transfer to the compression chamber. A compressing member takes up the intermediate chamber during its compression stroke to close the metering chamber whereby the latter may be filled just as soon as the compressing member closes the bottom of the metering chamber. The metering chamber is opened downwardly by the return stroke of the compressing member whereby the metered material is admitted to the intermediate chamber.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be clearly understood, it will now be described, by way of example, with reference to the accompanying drawings, wherein:

FIG. 1 shows a vertical section through a material portioning device including a metering chamber without a cover;

FIG. 2 shows a device similar to that of FIG. 1, but with a metering chamber covered by a cutting member;

FIGS. 3 to 5 show the device according to FIG. 2 with a full, covered metering chamber; an empty, covered metering chamber; and a full, but not yet covered metering chamber.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

The portioning device shown in FIG. 1 comprises a metering chamber 1 which is open at the top and bottom and which flares conically in a downward direction. At its bottom the metering chamber 1 leads into an intermediate chamber 2 of, for example, rectangular cross section. The intermediate chamber 2 in turn leads into a compressing chamber 3 of which one lateral side wall 3' can be opened, for example by hinging the wall 3' to the chamber 3 by a hinge 3''. The wall 3' which is normally closed would be opened in the direction of the arrow A. The contours or cross-sectional areas of the vertical longitudinal sections of the chambers 2 and 3 are congruent.

A compressing member 4 is provided whose longitudinal section corresponds to the vertical longitudinal section of the chambers 2 and 3. The width of the member or rather its top surface is slightly larger than the bottom opening of the metering chamber 1 to close the latter when the compressing member 4 is in its fully advanced or rightward compressing position. The member 4 is movable by a crank mechanism 5 from the compressing position shown in FIG. 1 to the rest position shown in FIG. 2. In the retracted position of FIG. 2 the lower end of the metering chamber 1 opens into the intermediate chamber 2.

A cutting member 7 is arranged immediately above the plane of the inlet opening of metering chamber 1 for providing an automatic metering and compressing operation. The cutting member 7 is reciprocable in parallel to said plane as indicated by the arrow 7'. The member 7 is driven by a rotatable shaft 6 and has the shape of a circular knife. A funnel 8 with an outlet corresponding in cross section to that of the inlet of the metering chamber is arranged above chamber 1, with a space 9 therebetween sufficient to permit a friction free passage of the knife 7.

The device according to the invention operates as follows. Upon filling of the metering chamber 1 with material from the funnel 8, as shown in FIG. 3, the cutting member 7 separates the material in the metering chamber 1 from that still in the funnel. Thereafter the compressing member 4 is brought into its left hand rest position whereby the bottom closure is removed from the metering chamber 1 and the material in chamber 1 falls into the intermediate chamber 2 as shown in FIG. 4. In accordance with the present invention chamber 2 has a volume larger than chamber 1 or the volumes are about equal.

The compressing member 4 transfers the material from intermediate chamber 2 into the compression chamber 3 where the material is compressed. The volume of chamber 3 corresponds to that intended for the size of the portion to be produced by the device. Movement of the compressing member 4 from the left hand

rest position to the right hand compression position is effected by the crank mechanism 5 as shown in FIG. 1.

Even before the compression chamber 3 is completely emptied, metering chamber 1 can be filled again. By suitably coupling the driving connection between the cutting member 7 and the compressing member 4 in any conventional manner, the entire operation may be made completely automatic.

One of the advantages of the device of the present invention is seen in that the intermediate chamber 2 makes it possible to feed material into the metering chamber just as soon as the lower outlet opening of the metering chamber 1 is closed by the member 4 toward the end of its compression stroke, since the content of the metering chamber has been transferred already at the beginning of the compression to the intermediate chamber. The metering chamber may thus be filled again even before the compression chamber 3 is emptied through an opening not specifically shown. The return of the compressing member 4 to its left position will empty the metering chamber into the intermediate chamber. Also compressing member 4 accomplishes an excellent compression of the material without placing a load on the cutting member when the latter closes the metering chamber 1, since the pre-portioned material to be compressed is being fed from the larger intermediate chamber 2 which has no closure means into the smaller compression chamber 3 by the member 4.

Another advantage is seen in that the present cutting bar 7 in contrast to prior art devices is not subjected to a load during compression of the material. Hence, it can be constructed with due regard to its two intended functions; namely, cutting through the material and closing off the separated portion from the remaining material. Further, the members 4 and 7 may be drivingly interconnected, for example, by cam means C in such a way that their synchronous cooperation is assured whereby the cutting member 7 is moved for a short period of time into a withdrawn position to open the inlet of the metering chamber in response to member 4 reaching its compressing end position. Thus, the portioning device according to the invention can operate automatically since independently of the portion which is still in the compression chamber 3 and independently of the emptying of the compression chamber, filling of the metering chamber with new material may be initiated solely as a function of the compressing end position of the member 4.

Although the invention has been described with reference to specific example embodiments, it is to be understood that it is intended to cover all modifications and equivalents within the scope of the appended claims.

What is claimed is:

1. A device for portioning and compressing material, comprising a metering chamber having an inlet and an outlet, an intermediate chamber connected to receive material from said outlet and having a volume at least as great as the volume of said metering chamber, a compression chamber connected to receive material from said intermediate chamber, a compression piston mounted to reciprocally extend through said intermediate chamber into said compression chamber and having a material compressing position in which it blocks said outlet and a further position permitting transfer of material from said outlet through said intermediate chamber, and means for selectively blocking said inlet.

2. The device of claim 1, wherein said means for blocking said inlet comprises rotary knife means rotatable in a plane parallel to the direction of movement of said piston.

3. In a portioning device for a material compressing apparatus of the type having a metering chamber with a given volume for receiving and metering a predetermined amount of material to be compressed, the metering chamber having an inlet and an outlet, and a compression chamber for receiving metered material from said outlet; the improvement comprising an intermediate chamber located between said compression chamber and said outlet of said metering chamber, the volume of said metering chamber being greater than the volume of said compression chamber, the volume of said intermediate chamber being at least as great as the volume of said metering chamber, said portioning device further comprising movable cutting means at said inlet of said metering chamber for severing the material and for temporarily closing said inlet of the metering chamber.

4. The device according to claim 3, further comprising reciprocable means for moving said predetermined amount of material from said intermediate chamber to said compression chamber.

5. The device according to claim 4, wherein said intermediate chamber and said compression chamber are arranged in alignment with each other and said reciprocable means is a piston, whereby adjacent sectional areas of the intermediate chamber and of the compression chamber correspond to each other.

6. The device according to claim 5, wherein said piston is reciprocable between a first end position outside said intermediate chamber and a second compressing end position whereby the piston in its second end position separates said intermediate chamber from said metering chamber by closing the outlet of the metering chamber.

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