

Sept. 8, 1959

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MEANS FOR EXTRUDING MOLDABLE MATERIAL
HAVING VISCOUS PROPERTIES
Filed Nov. 6, 1953

2,902,949

Fig. 1.

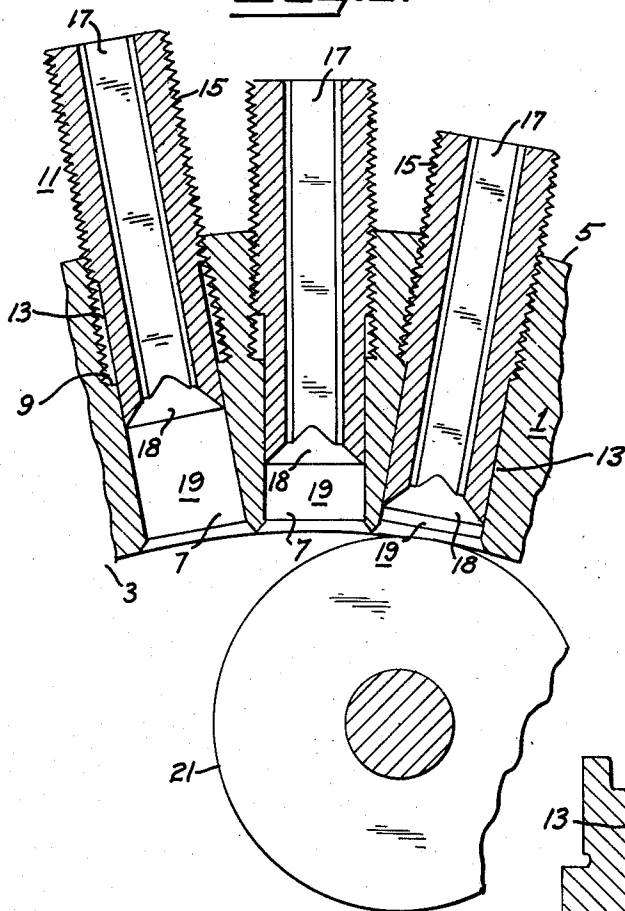


Fig. 2.

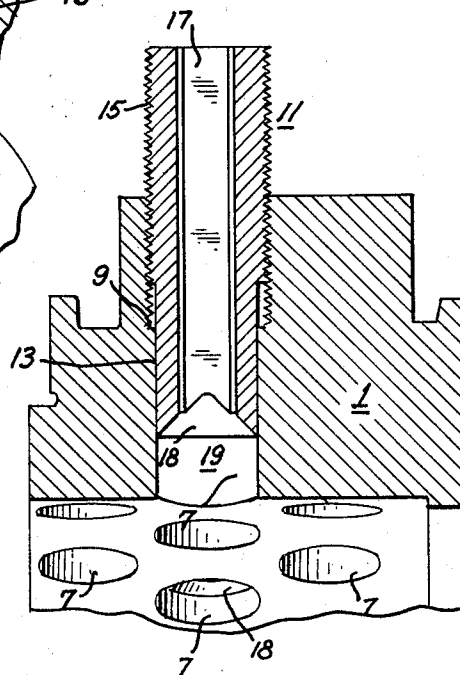
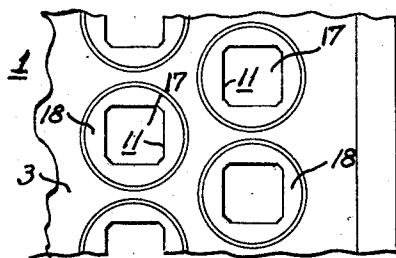


Fig. 3.



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1

2,902,949

MEANS FOR EXTRUDING MOLDABLE MATERIAL HAVING VISCOUS PROPERTIES

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Application November 6, 1953, Serial No. 390,442

3 Claims. (Cl. 107—14)

My invention relates to the extrusion of material and more particularly to a means for extrusion of soft moldable material such as cattle feed mixes, for example, having a high molasses content which imparts to the material a somewhat viscous character. Considerable difficulty is experienced in producing from such material, nice firm pellets.

Among the objects of the present invention are:

(1) To provide a novel and improved means for extruding soft moldable material having viscous properties.

(2) To provide a novel and improved means for extruding soft moldable material having viscous properties and forming therefrom, nice firm pellets.

Additional objects of my invention will be brought out in the following description of a preferred embodiment of the same, taken in conjunction with the accompanying drawings, wherein

Figure 1 is a fragmentary view depicting the invention as applied to a ring die and illustrates the same in section; and

Figure 2 is a view in section transversely of the die of Figure 1; and

Figure 3 is a view looking at the compression side of the die of Figure 1.

Referring to the apparatus illustrated in the drawings, the means for carrying out the present invention involves a die 1 having a compression side 3, a discharge side 5, and a plurality of cylindrical passages 7 through the die from the compression side to the discharge side, each of which passages at the discharge end being enlarged to form an intermediate shoulder 9, the enlarged portion of each such passage being threaded.

Each die passage is provided with a removable insert 11 having a smooth wall portion 13 adapted to slidably fit the compression end of the die passage, and an enlarged threaded portion 15 adapted to thread into the threaded end of the die passage. The smooth wall portion may be designated the compression end due to its proximity to the compression side of the die when assembled therein.

Each such insert has an extrusion passage 17 therethrough and its compression end countersunk to provide a flared surface 18 merging with the wall of the die passage 7. In length, the compression end of the insert is less than the distance of the shoulder 9 from the compression side of the die, to form a cylindrical chamber 19 in the compression side of the die when the insert is assembled therein to the point of abutting said shoulder. Such chamber is rendered adjustable by merely unthreading the insert to any degree desired.

In utilizing a die for extrusion purposes, the material to be extruded is usually piled up against the compression side of the die, over which a compression member, such as a roller 21, is caused to make repeated excursions, with each excursion forcing additional material into a die passage. In accordance with conventional practice, the material is forced directly into the extrusion pas-

2

sage which starts at the compression surface of the die or very close thereto in the event the die passages are countersunk.

In accordance with the present invention, the material is first compacted or consolidated in the chambers 19 and such consolidated material will, as a result, be of greater density than the material prior to such consolidation. Accordingly, when the compression member or roller makes its next excursion over the particular die passage, the material which had previously been consolidated by it during the prior pass of the roller, will now be forced into the extrusion passage of the insert, during which its density is further increased, as a result of which the extrusion will be firm, in spite of the viscous properties of the material prior to consolidation in the chamber.

For best results, with materials of differing characteristics, the size of the chambers should vary, and this is made possible in the present invention by the adjustability of each insert.

Pellets are conventionally formed by breaking the extrusions as they emerge from the discharge side of the die, usually through the employment of knives which are caused to rotate relative to the die. When all of the inserts are properly adjusted for a particular material, the discharge ends of such inserts will all lie in cylindrical surface, making it possible to employ knives in the conventional manner.

While the invention has been illustrated as applied to a die of the ring type, it is apparent that the invention is not limited to any particular type of die, just so long as inserts may be assembled therein in the manner indicated.

The employment of inserts offers the advantage of their being readily replaceable, thus making it possible to employ inserts with extrusion passages of different sizes and shapes, in addition to offering the further advantage of being able to replace elements which may have become worn or damaged.

While I have disclosed my invention in its preferred form, it is apparent that the same is subject to further modification and alteration without departing from the underlying principles involved, and I accordingly do not desire to be limited in my protection to the specific details illustrated and described except as may be necessitated by the appended claims.

I claim:

1. Means for the extrusion of moldable material having viscous properties, comprising a die having a compression side and a discharge side and a plurality of passages therethrough from said compression side to said discharge side, each of said passages, at least along the compression end portion, having a smooth wall cylindrical surface longitudinally thereof, an insert for each of said die passages, each said insert having an extrusion passage therethrough and a compression end of a size and shape conforming to the compression end of a die passage to slidably fit the same, and means for adjustably holding an insert in its die passage with its compression end within said cylindrical surface and axially adjustably spaced from the compression side of said die to form a chamber in the compression side of said die having a smooth wall surface when said insert is assembled therein.

2. Means for the extrusion of moldable material having viscous properties, comprising a die having a compression side and a discharge side and a plurality of passages therethrough from said compression side to said discharge side, each of said passages at the discharge end being enlarged to form an intermediate shoulder, an insert for each of said die passages, each said insert having an extrusion passage therethrough and a compression end adapted to slidably fit the compression end of a die passage, and an enlarged discharge end to provide an abutment for en-

3

gement with said shoulder to limit the extent to which an insert may be assembled in its associated die passage, the compression end of said insert being countersunk and of a length less than the distance of said shoulder from the compression side of said die to form a chamber in the compression side of said die when said insert is assembled therein.

3. Means for the extrusion of moldable material having viscous properties, comprising a die having a compression side and a discharge side and a plurality of passages therethrough from said compression side to said discharge side, each of said passages at the discharge end being enlarged to form an intermediate shoulder, said enlarged portion being threaded, an insert for each of said die passages, each said insert having an extrusion

4

passage therethrough and a compression end adapted to slidably fit the compression end of a die passage, and an enlarged discharge end threaded to screw into the threaded end of such die passage, the compression end of said insert being countersunk and of a length less than the distance of said shoulder from the compression side of said die to form a chamber in the compression side of said die when said insert is assembled therein.

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