

FLOW DIVIDER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to devices used to distribute fluent material, and more particularly to a device that divides a material flowing from a single source or a small number of sources into a plurality of streams of substantially equal volumetric flow rate.

2. Description of the Related Art

It is desirable in food processing applications to slice ground sausage rapidly and deposit the sausage on a moving substrate, such as a conveyor belt, beneath the slicing machine. Sausage is commonly made in specialized sausage-making machines that are known in the food processing industry. These machines, and machines that are made to pump previously-ground sausage, produce a stream of ground sausage that is fluent enough to be conveyed as a fluid, but which contains solids and semi-solids, and therefore it cannot be treated as a homogeneous material. Because of the heterogeneity of raw sausage, and the difficulty of conveying such a material conventionally, sausage is often placed in food slicing machines in batches of frozen or semi-frozen logs of a predetermined volume.

In order to produce ground sliced sausage patties rapidly enough to be economically feasible, a machine must not only slice the sausage rapidly, but it must slice the sausage in each of a plurality of lanes that are aligned above and across the moving substrate. These lanes must produce uniform slices, which requires that conditions be uniform in each lane. However, a batch process is particularly inefficient and susceptible to contamination due to the time and cost of producing chilled logs of product and the handling of such logs by personnel. Furthermore, when a slicing machine has several lanes slicing ground sausage in a batch process, there is inefficiency introduced in the form of lost time during refilling, and loss of material at the beginning and end of each log.

It is desirable to have a device that facilitates the use of a continuous process rather than a batch process in order to eliminate the inefficiencies inherent in a batch process, to minimize potential contamination, and to avoid the inconsistencies inherent in batch processes. However, in order to obtain consistent slice characteristics in each of the lanes, any device that conveys sausage to the plurality of lanes must supply the sausage at a volumetric flow rate that is equal in each lane. Equal volumetric flow rate has only been possible conventionally using the batch process, because it has been impossible before the present invention to convey a heterogeneous material such as raw sausage in a plurality of flowing streams of equal volumetric flow rates.

BRIEF SUMMARY OF THE INVENTION

The invention is a flow divider for receiving fluent matter from at least one source, such as a sausage pump, and dividing the fluent matter substantially equally among a plurality of destinations, such as the parts of a food slicing machine corresponding to each of the lanes above a conveyor belt. The invention could alternatively be operated in reverse to function as a mechanism to combine fluent matter from a plurality of sources.

The flow divider comprises a housing with a first chamber. The first chamber is defined by a first radially inwardly facing surface and a first wall. The first chamber has an inlet in fluid communication with said at least one source and an

outlet in fluid communication with a first one of said plurality of destinations. A first cylindrical hub is rotatably mounted in the first chamber, a first radial slot extends through the first hub, and a second radial slot extends through the first hub transverse to the first slot. A first vane is slidably mounted in the first slot, and a second vane is slidably mounted in the second slot. Each of the vanes has opposite vane ends seating against the first radially inwardly facing surface.

The flow divider includes a second chamber in the housing. The second chamber is defined by a second radially inwardly facing surface and a second wall, and the second chamber has an inlet in fluid communication with said at least one source and an outlet in fluid communication with a second one of said plurality of destinations. Thus, each chamber has an inlet in fluid communication with the source, and each chamber has an outlet in fluid communication with a corresponding unique destination. Therefore, sausage enters the housing and is divided by the apparatus into equal volumetric flow rate streams going to each destination.

A second cylindrical hub is rotatably mounted in the second chamber and is drivably linked to the first hub. The second hub has a third radial slot and a fourth radial slot transverse to the third slot. A third vane is slidably mounted in the third slot and a fourth vane is slidably mounted in the fourth slot. Each of the vanes has opposite vane ends abutting the second radially inwardly facing surface.

The flow divider can also include a third and other additional chambers, each being essentially modular and having a substantially identical, or modified, hub, vanes, inlet and outlet. This modular nature of the invention's components permits the construction of a device that causes the flow of fluent material from a source to be divided into essentially as many equal flow rate destination streams as is desirable. In a preferred embodiment, the housing comprises a plurality of attached housing bodies, and the housing bodies, hubs and vanes can all be disassembled for thorough cleaning.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

FIG. 1 is an end view illustrating the preferred housing body.

FIG. 2 is a view in section through the line A—A of FIG. 1.

FIG. 3 is a view in section through the line B—B of FIG. 1.

FIG. 4 is a side view illustrating the preferred hub.

FIG. 5 is an end view illustrating the preferred hub.

FIG. 6 is an end view illustrating the preferred hub.

FIG. 7 is a side view illustrating the preferred vane.

FIG. 8 is an edge view illustrating the preferred vane.

FIG. 9 is an exploded view in perspective illustrating the preferred housing body and its corresponding hub and vanes.

FIG. 10 is view in perspective illustrating the preferred hub with corresponding vanes in an operable position on the hub.

FIG. 11 is a view in perspective illustrating the preferred hub and vanes in an operable position in the housing body.

FIG. 12 is an exploded view in perspective illustrating the preferred housing body, hub and vanes combined with another housing body, hub and vanes.

FIG. 13 is an exploded view in perspective illustrating a plurality of housing bodies, hubs and vanes mounted together.