Aug. 23, 1966 A. E. ZISELBERGER 3,268,212

FOAM GENERATING MACHINE

Filed Nov. 8, 1963 2 Sheets-Sheet 1

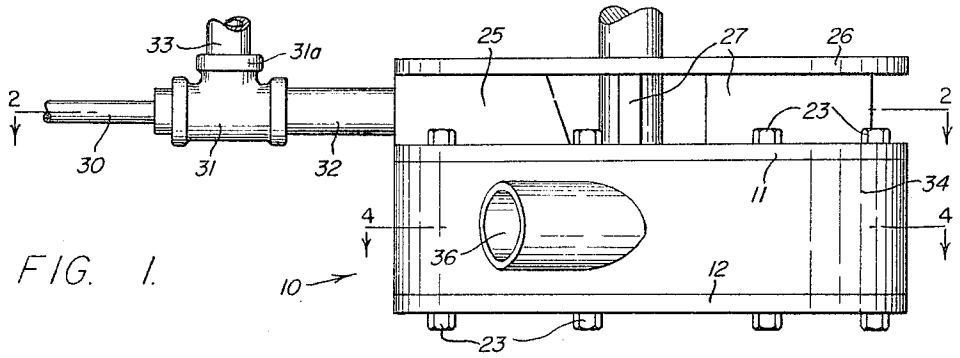


FIG. 1.

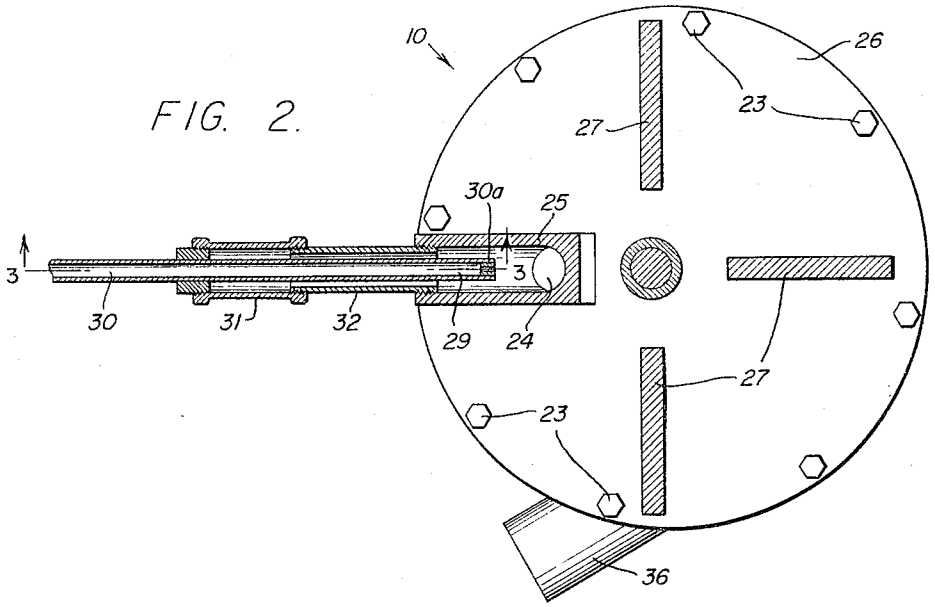
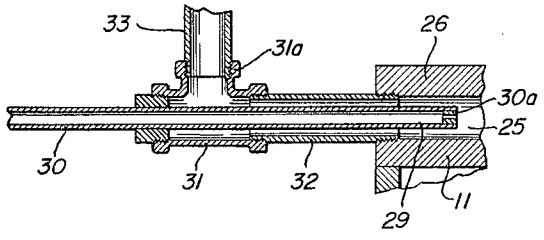


FIG. 2.

FIG. 3.



INVENTOR.
ALBERT E. ZISELBERGER
BY Mallinckrodt Mallinckrodt and
ATTORNEYS

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Filed Nov. 8, 1963 2 Sheets-Sheet 2

FIG. 4.

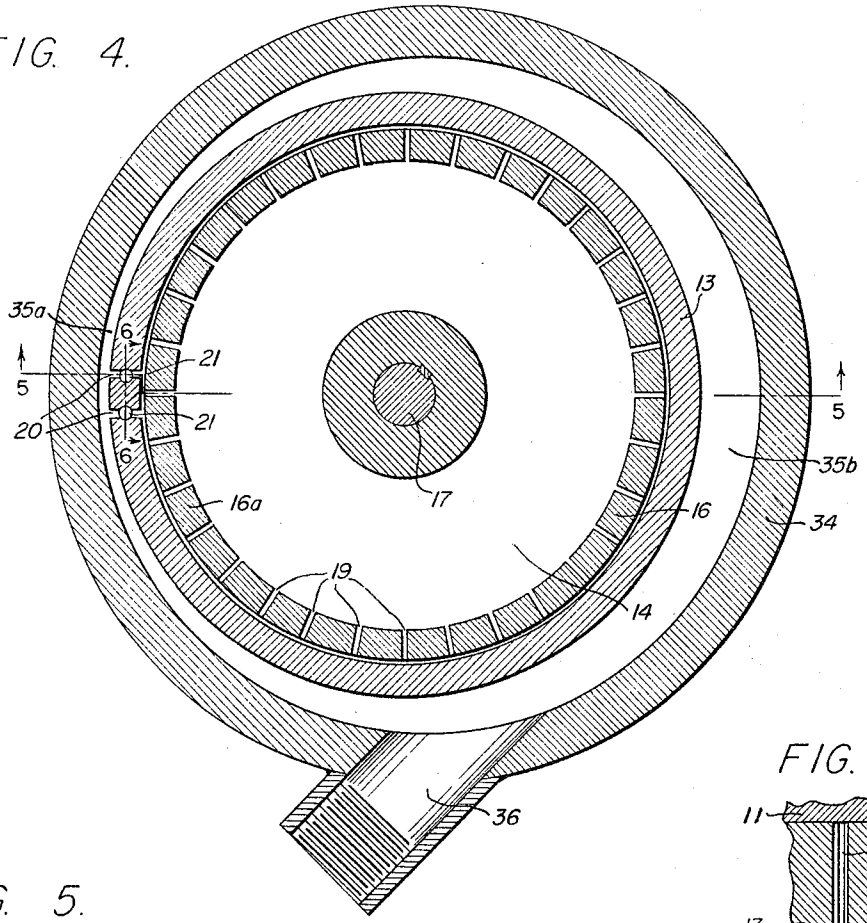


FIG. 6.

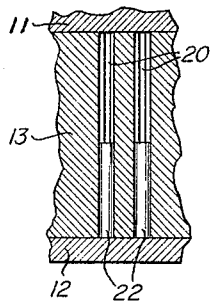
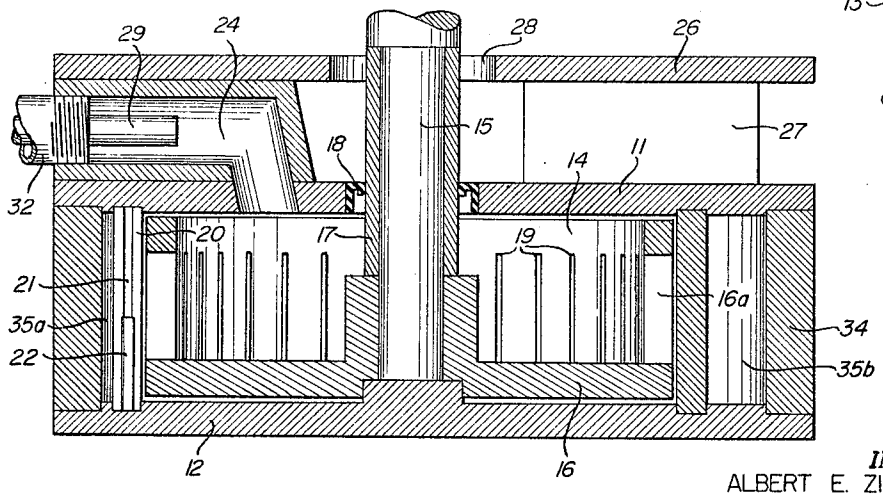


FIG. 5.



INVENTOR.
ALBERT E. ZISELBERGER

BY Mallinckrodt and Mallinckrodt

ATTORNEYS

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FOAM GENERATING MACHINE

Albert E. Ziselberger, Cody, Wyo., assignor, by direct and mesne assignments, to Manufacturing Patents Associates, a co-partnership of Utah

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5 Claims. (Cl. 259—7)

This invention relates to machines for generating foam from a foaming solution, for use in various industrial operations.

In the making of gypsum wall board, foam is introduced into the plaster mix to lighten and improve the texture of the set gypsum. The foam is normally produced from a soap solution by introducing air thereinto. This is often done by using a series of pumps and air injection regulators.

The invention is concerned with providing an exceptionally efficient, single unit for promptly generating profuse quantities of fine-textured foam of desired weight per unit volume.

A principal feature of this foam generating machine is the close tolerance mounting of an annular rotor, having a circumferential series of restrictive passages, within a circular chamber whose peripheral defining walls are provided with one or more restrictive passages within a localized area and in communication with the series of passages in the rotor during rotation of the latter. A foam-forming solution having air or other suitable gas entrained therein is introduced into the rotor as it rotates and is ejected through the restrictive passages to produce a fine-textured foam whose weight per unit volume is dependent upon the quantity of air entrained in the feed solution.

Another feature is the provision of an eccentric, foam-receiving chamber surrounding the walls of the rotor chamber so as to have a narrow foam-receiving portion merging into a relatively wide foam-discharging portion, there being an outlet for foam leading from this latter portion. In this way, a supply of foam is constantly being crowded from the narrow portion into the wide portion and to discharge.

There is shown in the accompanying drawings a specific embodiment of the invention representing what is presently regarded as the best mode of carrying out the generic concepts in actual practice. From the detailed description of this presently preferred form of the invention, other more specific objects and features will become apparent.

In the drawings:

FIG. 1 represents an elevation of the machine as installed for use;

FIG. 2, a longitudinal section taken on the line 2—2 of FIG. 1;

FIG. 3, a fragmentary section taken on the line 3—3 of FIG. 2;

FIG. 4, a transverse section through the rotor, rotor chamber, and foam-receiving chamber as taken on the line 4—4 of FIG. 1 and drawn to a larger scale;

FIG. 5, an axial section through the same structure as taken on the line 5—5 of FIG. 4; and

FIG. 6, a fragmentary section taken on the line 6—6 of FIG. 4.

Referring to the drawings:

In the illustrated form of the machine, a housing **10** has opposing walls **11** and **12** of disk formation and an annular wall **13** peripherally thereof and interposed therebetween to define a closed chamber **14**. Within this chamber, on a central bearing **15**, is rotatably mounted a rotor **16** having an annular wall **16***a*. This rotor has a close tolerance fit, e.g. 0.01 inch, with the defining walls **11**, **12**, and **13** of chamber **14**.

Rotor **16** is rigidly affixed to a shaft **17**, which extends through a journal seal **18** in wall **11** and is connected by any suitable drive arrangement (not shown) to some power means, such as an electric motor.

Annular wall **16***a* of the rotor is provided with a circumferential series of mutually spaced, restrictive passages **19** extending therethrough. As illustrated, these are preferably closely spaced, narrow, axially extending, radial slots. For cooperation with such passages **19** in producing foam from a foam-forming solution introduced into the space within annular wall **16***a* of the rotor, restrictive passage means are provided within and extending through a localized area of annular wall **13** of housing **10**. As illustrated, such restricted passage means preferably takes the form of at least one slot **20** corresponding to the rotor slots **19**. In the present instance, there are two such slots **20** extending through housing wall **13** from top to bottom thereof.

For enabling the foam generating capacity of the machine to be changed from time to time as desired, means are provided for closing off a selected portion of each slot **20** to reduce the capacity from its design maximum. As shown this is conveniently accomplished by providing a bore hole **21**, FIG. 4, longitudinally of each slot intermediate its inflow and discharge openings and positioning a pin **22** of selected length within such hole. To this end, the walls of housing **10** are removably held together fluid tight in any suitable manner, for example, by cap screws **23** passing through interposed gaskets (not shown) in conventional fashion.

The foam-forming solution is introduced within rotor **16** by way of a passage **24** through housing wall **11** and a conduit **25**, see especially FIGS. 2 and 5. For the sake of symmetry, the conduit extends radially of the housing, and is covered by a disk **26** supported by radial members **27**, shaft **17** being accommodated by an aperture **28** therethrough. The motor (not shown) is conveniently mounted on disk **26**.

In order to entrain the necessary air in the foam-forming solution introduced into the rotor through conduit **25**, an injection nozzle **29** is advantageously employed. This comprises an air supply pipe **30**, concentrically mounted within the through passage of a T pipe fitting **31** and of a nipple **32** and having a restricted injection orifice **30***a* at its discharge end. A supply pipe **33** for a soap solution is connected to the lateral **31***a* of the fitting **31**. The solution is advantageously fed into supply pipe **33** by means of a variable speed, metering pump (not shown) to insure the desired volumetric rate of supply per unit time. An air regulator (not shown) is advantageously utilized to regulate the quantity of air in accordance with whether a light or heavy foam is desired. Thus, although a foam having a fine and uniform texture is always produced by the machine, its characteristics can be controlled and changed as desired.

Although the restricted passages **20** could discharge the generated foam into any container, it is much preferred that housing **10** include walls surrounding the rotor chamber walls so as to define a foam-receiving chamber therearound. As illustrated, housing disks **11** and **12** are of greater diameter than annular wall **13**, and the axis of rotor **16** and center of rotor chamber **14** are offset relative to the center of such disks. A circumferential wall **34** completes the defining of an eccentric foam-receiving chamber **35** having a narrow portion **35***a*, into which restricted passages **20** discharge the generated foam, and a relatively wide portion **35***b*, from which a foam outlet **36** leads.

By reason of the eccentric formation of chamber **35**, foam is crowded from the narrow portion thereof into the relatively wide portion and so to discharge into any

suitable conduit (not shown) connected to outlet **36** for delivery to the point of use.

Whereas there is here illustrated and specifically described a certain preferred construction of apparatus which is presently regarded as the best mode of carrying out the invention, it should be understood that various changes may be made and other constructions adopted without departing from the inventive subject matter particularly pointed out and claimed herebelow.

I claim:

1. A foam generating machine, comprising a housing having walls defining a closed, circular chamber having closed top and bottom and a substantially imperforate annular wall; an annular rotor fitted into said chamber with close tolerance, said rotor having a circumferential series of mutually spaced, restrictive passages extending therethrough; restrictive passage means within and extending through a localized area of the said annular wall from communication with said series of passages, as the rotor rotates, to the outside of said chamber; means for introducing within the rotor as it rotates, a foam-forming solution having a gas entrained therein; and means for rotating the rotor.

2. The machine of claim **1**, wherein the restrictive passages through the rotor are radial slots extending axially of the rotor.

3. The machine of claim **2**, wherein the restrictive passage means through a localized area of the annular wall comprise at least one slot substantially corresponding to those through the rotor; and wherein there is additionally provided, for each slot, means for closing off a selected portion of the slot to reduce the foam-generating capacity of the machine.

4. The machine of claim **1**, wherein the housing also has walls surrounding the chamber-defining walls to define a foam-receiving chamber.

5. The machine of claim **4**, wherein the walls surrounding the chamber-defining walls are eccentrically disposed with respect to said chamber-defining walls and the foam-receiving chamber is eccentrically annular with a narrow portion merging into a wide portion, the restrictive passage means for generated foam leading into the narrow portion; and wherein there is provided a foam outlet leading from the wide portion of the foam-receiving chamber.

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WALTER A. SCHEEL, *Primary Examiner.*

JOHN M. BELL, *Assistant Examiner.*