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[33] Austria
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616,080, Feb. 14, 1967, now abandoned.

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F16k 31/06, F16k 21/365
[50] Field of Search 137/624.18,
624.2, 604, 605; 251/122, 121, 145, 146, 335.1

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[54] DEVICE FOR DOSING FLUID OR PASTY
SYNTHETIC SUBSTANCE
3 Claims, 4 Drawing Figs.

[52] U.S. Cl. 137/624.18,
137/605, 251/335, 251/145

ABSTRACT: A device for dosing fluid or pasty synthetic material, to be used in connection with a walled mixing chamber, the wall being provided with conduit means, and valve means disposed in the conduit means and including valve seat means in the chamber wall. Valve actuating means operate the valve means, and an impulse actuator actuates the valve actuating means and thereby the valve means in accordance with a predetermined time schedule.

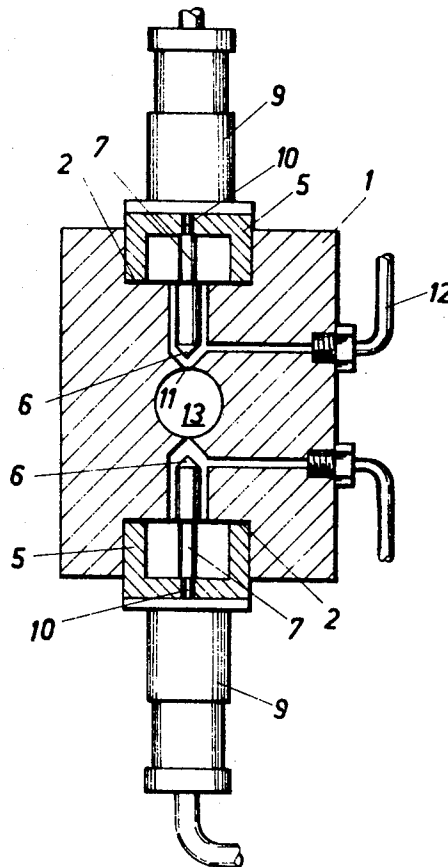
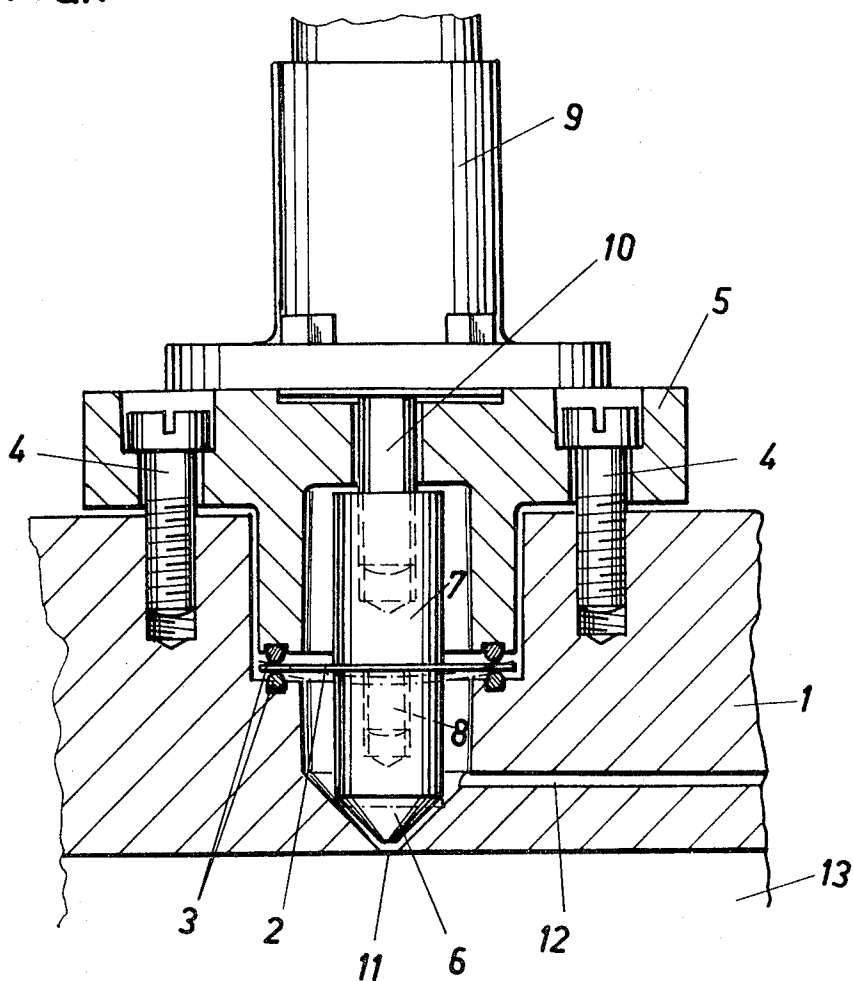


FIG. 1



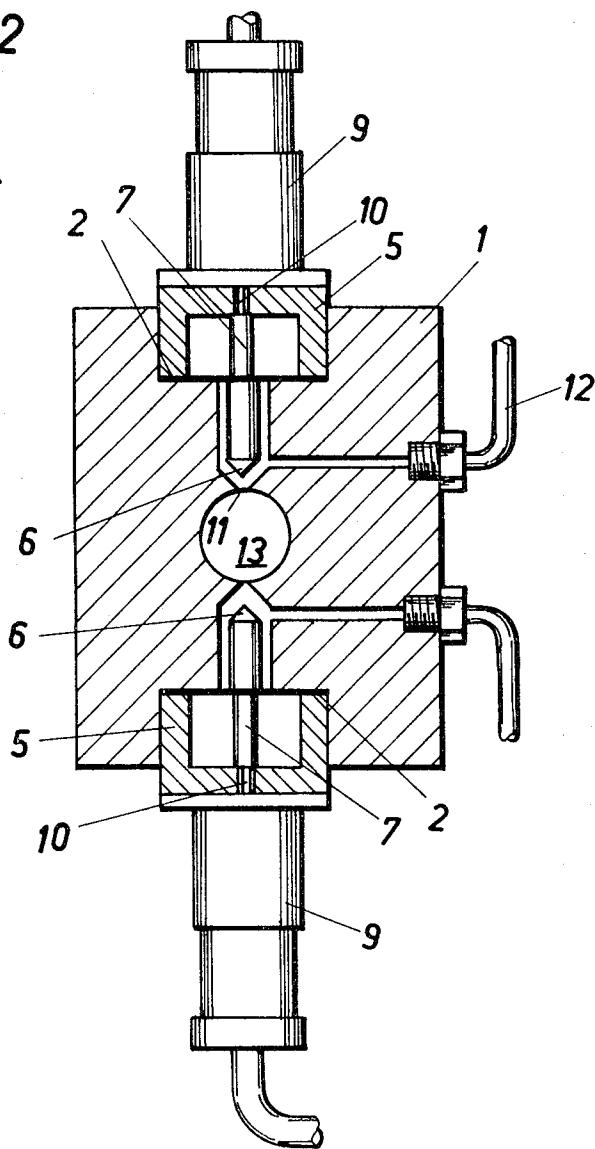
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FIG. 2



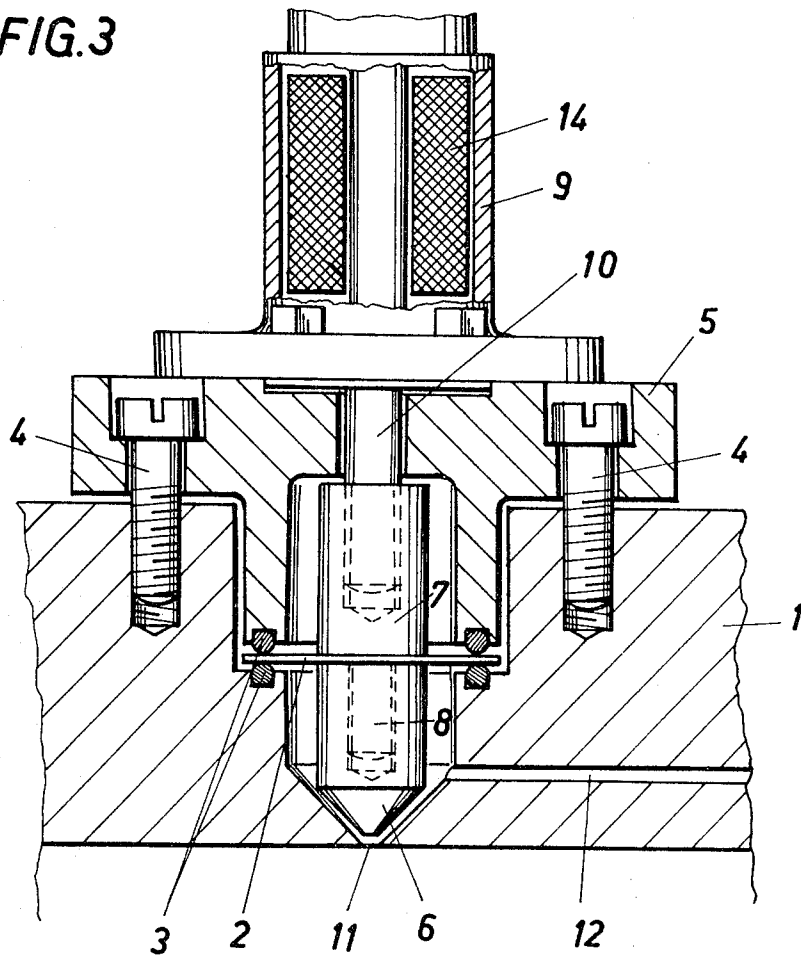
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FIG. 3



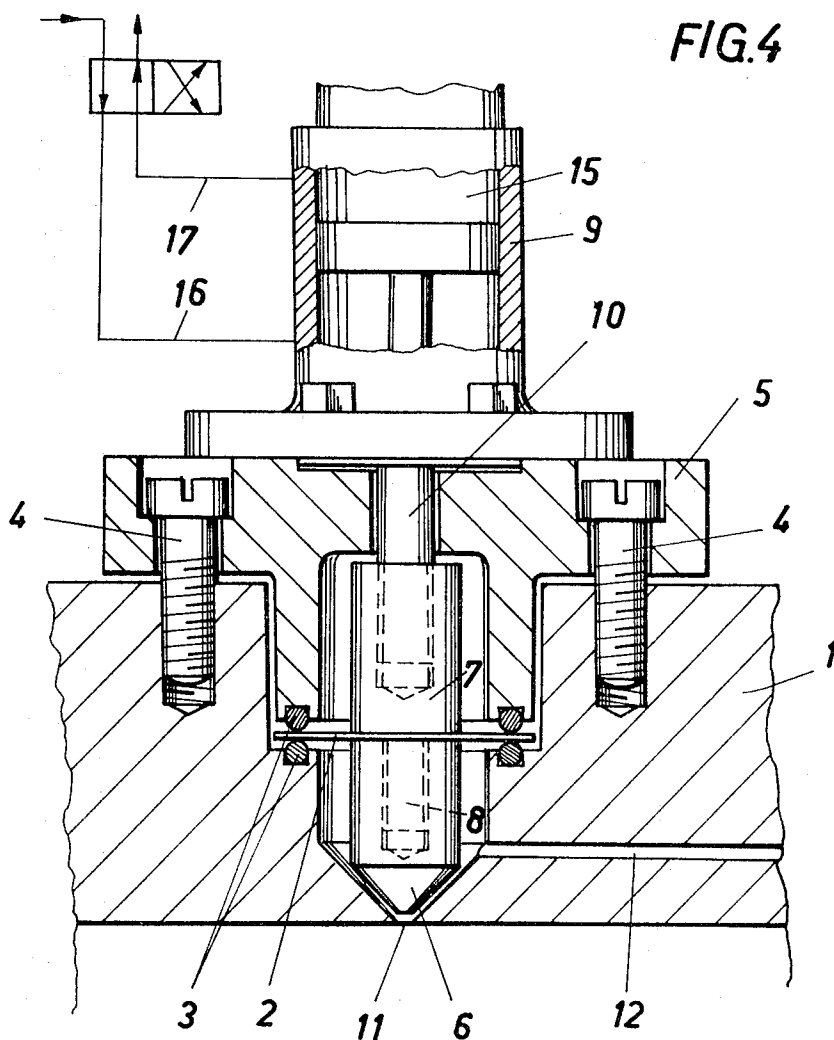
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FIG. 4



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DEVICE FOR DOSING FLUID OR PASTY SYNTHETIC SUBSTANCE

This application is a continuation of application Ser. No. 616,080, filed Feb. 14, 1967 and now abandoned.

The invention relates to devices for dosing fluid or pasty synthetic material, and relates more particularly to such dosing devices for polyol-isocyanate hardening mixtures, or polyol-isocyanateadducts hardening mixtures, as they are used for making homogenous or porous polyurethane.

It is known to use such polyurethanes as prepolymers, for instance for the making of outer soles for shoes; the mixture is first put into a mixing chamber and then into a closed mold, is then gelled in the mold and finally is erected either with or without its addition of heat. The feeding of the mixture into the form usually is accomplished by means of low pressure machines.

In connection with such machinery, a problem has arisen in connection with the exact keeping of the formula during the intermittently applied necessary small dosages. During the manufacture of the mixture, it must be understood, the various mixture components must not only be fed simultaneously, but must enter absolutely at the same time into the mixing chamber, in order to achieve the desired finished product. Furthermore, it is also important to avoid conduits or bores between the valves that regulate the feeding of the mixing components and the mixing chamber, in order to prevent the clogging of such conduits or bores by the occurrence of dripping and hence of a premature reacting of remainders of the mixture components.

It is accordingly among the principal objects of the invention to provide a device for dosing fluid or pasty synthetic material that avoids the aforesaid drawbacks of the prior art.

It is another object of the invention to provide such a device in which the regulation of the amount of material components fed into the mixing chamber is controlled by valves that have their seats directly in the mixing chamber wall.

It is a further object of the invention to provide cone valves, for instance truncated cone valves for the above device that terminate flush with the internal wall surface of the mixing chamber.

It is still another object of the invention to provide valves for the aforesaid device, of the membrane type, which are actuated in accordance with a predetermined time schedule, preferably either pneumatically, hydraulically or electrically, from a common impulse actuator, such as an electric relay.

Further objects and advantages of the invention will be set forth in part in the following specification and in part will be obvious therefrom without being specifically referred to, the same being realized and attained as pointed out in the claims hereof.

With the above and other objects of the invention in view, the invention consists in the novel construction, arrangement and combination of various devices, elements and parts, as set forth in the claims hereof, certain embodiments of the same being illustrated in the accompanying drawings and described in the specification.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description, taken in connection with the accompanying drawing, in which FIG. 1 is a large scale fragmentary sectional view of a portion of the wall of a mixing chamber with a valve of the membrane type. FIG. 2 is a fragmentary sectional view similar to FIG. 1, though on a smaller scale, showing two valves of the membrane type in the wall of the mixing chamber.

FIGS. 3 and 4 are sectional views similar to FIG. 1, but showing the shifting device as an electromagnetic solenoid and a fluid cylinder, respectively.

In carrying the invention into effect in the embodiments which have been selected for illustration in the accompanying drawings and for description in this specification, there is provided a wall 1 of a mixing chamber 13. The wall 1 has conduit means, such as a central recess shown vertically in the drawing, and a feed passage 12 for one of the fluid or pasty synthetic materials, and the passage 12 intercommunicates

with the recess. A valve of the membrane type is disposed in the recess.

The valve includes a membrane 2 that is composed either of metal, rubber or a synthetic material such as tetrafluorethylene. The membrane 2 is clamped near its external portion between two copper rings 3, and the clamping is sufficiently tight to seal the recess so that any material fed through the passage 12 cannot go above the membrane 2 in the recess. The copper rings 3 are held by means of bolts 4 within a cylindrical projection of a cover 5, which projection extends into the recess above the membrane 2. In FIG. 2, due to its small scale, the copper rings 3 have not been shown.

Below the membrane 2, the valve comprises a valve stem that has a tapered end portion or cone 6, that cooperates with a matching tapered valve seat that is formed in the recess within the wall 1. The valve seat terminates at an opening 11 into the mixing chamber, the opening 11 forming a nozzle for the entry of the dosed material into the mixing chamber 13 when the valve is in the open position. The membrane 2 is spaced above said opening 11 for a distance that is greater than the distance between the plane of intercommunication at which the passage 12 intersects the recess and the opening 11. In the closed position, the end of the valve cone 6 is substantially flush with the opening 11 as shown in broken lines in FIG. 1. In the closed position, the end of the valve cone 6 terminates flush with the internal wall surface of the mixing chamber 13 as shown in broken lines in FIG. 1.

Valve actuating means are provided that comprise a valve actuator, such as a shifting device 9 that may for instance be an electromagnetic solenoid 14, or an oppositely actuatable fluid cylinder 15, such as a hydraulic cylinder, or an oppositely actuatable air cylinder fed by fluid from conduits 16, 17. The shifting device 9 carries a projection 10 that is in threaded engagement with a metallic body 7. The metallic body 7 includes a protrusion 8 that is in threaded engagement with the interior of the valve stem, and projects through the membrane 2. By this arrangement, the valve stem is secured in sealing relation to the membrane 2, and can vibrate with the membrane, yet the membrane seals effectively the recess so that no material can escape upwardly in the recess beyond the membrane 2.

When the shifting device 9 is shifted upwardly (with respect to FIG. 1 of the drawing), then the valve stem with its cone 6 is lifted off the valve seat, so that there will be cleared the path to the opening 11, so that the fluid or pasty material may be fed from the passage 12 through the recess and through the opening into the mixing chamber.

When the shifting device 9 is moved in the opposite direction, namely downwardly (with respect to FIG. 1 of the drawing), the opening 11 will be closed by the valve stem, thereby precluding the entry of any material from the recess into the mixing chamber. The movement of the valve stem, owing to its connection to the clamped membrane 2, proceeds only for a distance of a few tenths of 1 millimeter. As long as the valve is in operation, the passage 12 needs not to be closed.

In FIG. 1 of the drawing, there has been shown but a single valve. Actually, the valve means may comprise a plurality of valves, each valve being of the type shown in FIG. 1, and each being provided with a valve actuating means such as a valve actuator or shifting device 9 as shown in FIG. 2. Control means may be provided, such as an impact actuator (not shown) in driving connection with the valve actuating means, namely either electric or hydraulic or fluid or mechanical driving connection, so as to actuate all the shifting devices of the individual valves in accordance with a predetermined time schedule in timed relationship, for instance in accordance with a preferred embodiment synchronously. By such a synchronous arrangement, the mixture components will be fed simultaneously and in exact predetermined amounts into the mixing chamber, as each valve is assigned to a specific mixing component namely fluid or pasty synthetic material, a dosed amount of which is to be propelled into the mixing chamber. The impact actuator may be an electric relay.

As the instant invention dispenses with delivery channels or conduits between the valves and the mixing chamber, there exists no possibility for reacting remainders of such components to clog such channels; and thereby there is promoted a continuous and uninterrupted undisturbed operation of the machine.

All the valve openings, of the type of the opening 11, open up into the mixing chamber 13. The mixing chamber 13 preferably is provided with an agitating device (not shown), and from the mixing chamber the prepolymer mixture which, in the mixing chamber has been provided with the properly dosed admixtures, will proceed into a mold (not shown).

We wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus described the invention, what we claim as new and desire to be secured by Letters Patent, is as follows:

1. In a device for dosing fluid or pasty synthetic material, for use in connection with a walled mixing chamber structure, in combination, said wall defining conduit means, valve means disposed in said conduit means and including valve seat means in said wall, a valve actuating means operable for operating said valve means, and an impulse actuator in driving connection with said valve actuating means and operable to actuate said valve actuating means and thereby said valve means in accordance with a predetermined time schedule, said conduit means defining a first conduit forming a passage for at least one material to be dosed, and a second conduit intercommu-

nicating with said first conduit and defining a recess in said wall, said valve seat means including at least one valve seat formed in said recess and being adapted to form an opening into said chamber, said valve means comprising at least one membrane valve including a valve stem shiftable in opposite directions to and from said valve seat to close said valve seat substantially flush with the interior surface of said walled mixing chamber and respectively to open said valve, a membrane disposed in said recess and spaced from said opening for a distance greater than the distance between the plane of intercommunication between said first and second conduits and said opening, said valve stem being secured in sealing relation to said membrane, clamping means operable for clamping said membrane in sealed relation in said recess, thereby sealing said recess, said valve actuating means including a shifting device connected to said valve stem and being operable to shift the stem and said membrane for sealed valve opening and closing, thereby to admit dosed amounts of said material into said chamber.

2. In a device, as claimed in claim 1, said valve means comprising a plurality of valves, said valve actuating means including a plurality of valve actuators each in driving connection with a valve, said impulse actuator being operable to operate all of said valve actuators and hence said valves in timed relationship.

3. In a device, as claimed in claim 2, said impulse actuator actuating all of said valve actuators and hence all of said valves synchronously.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,583,439 Dated June 8, 1971

Inventor(s) Ernst Dolenz et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet [73] "Osterrachisch-" should read
-- Osterreichisch- --.

Signed and sealed this 7th day of March 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents