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71 Applicant: **DEERE & COMPANY, 1 John Deere Road,  
Moline Illinois 61265 (US)**

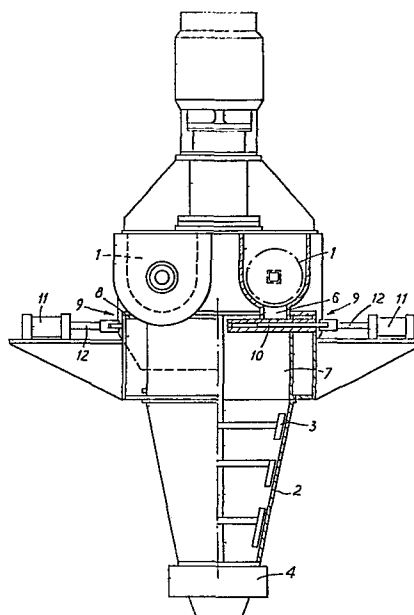
72 Inventor: **Tacke, Dieter, Burgstrasse 38,  
D-6900 Heidelberg (DE)**

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74 Representative: **Pears, David Ashley et al, REDDIE &  
GROSE 16 Theobalds Road, London WC1X 8PL (GB)**

54 **Mixer for chemically bound moulding mixtures.**

57 Two auger conveyors (1) feed respective streams of moulding sand premixed with the two components respectively of a cold setting binder into a mixing chamber (2) wherein rotary paddles (3) form the final mixture. In order to prevent the waves created by the paddles introducing fully mixed material into the conveyor outlets (6) and causing deposits on the conveyors, an intermediate chamber (7) at least 30 cm high is interposed between the outlets (6) and the mixing chamber (2). Moreover slide valves (9) are provided in the outlets (6) to permit exact regulation of the proportions of the two components even when the mixer is operated with repeated starts and stops.



MIXER FOR CHEMICALLY BOUND MOULDING MIXTURES

The invention relates to a mixer of the type set forth in the introductory part of claim 1. Known mixers of this type are used in present foundry practice to feed to the mixing chamber two streams of washed and dried quartz moulding sand or other moulding material, premixed with a resin (e.g. a furan resin) and a hardener (e.g. PTS) respectively. By keeping the binder components thus separate no reaction takes place in the mixing conveyors, such as auger conveyors, which should therefore not require cleaning. The reaction, typically a cold-hardening reaction, does not start until the components are brought together and mixed in the mixing chamber and the mixture is emptied out before significant reaction has taken place, so that there is enough time for handling the prepared mixture.

A mixer of this type is operated in a mixed continuous/ batch manner. Depending on demand, batches may be intermittently mixed and used or there may be more or less constant withdrawal of mixed material with corresponding feed of the premixed streams in order to maintain an adequate level in the mixing chamber for efficient mixing and a long enough residence time in the mixing chamber. Although the mixer will be operated with the intention of maintaining a constant level in the mixing chamber, fluctuation in the level is unavoidable and the higher the level, the greater the danger that the waves in the material being mixed will rise to the level of the conveyor outlets and introduce some mixed reacting components into the outlets. This effect occurs in practice and leads to deposits on the auger flights near the conveyor outlets.

These deposits obstruct the outlet openings from the conveyors and disturb the defined feed cross-sections which are intended to ensure the correct proportions of binder components in the final mixture. This in turn affects the intended hardening time and the desired physical characteristics of the mixture after completion of the hardening process.

Another disadvantage of known machines is that, at the end of a mix, the feed conveyors are first switched off. Depending upon the pitch angle of the auger flighting, the quantities of premix in the augers. and the position at which the augers stop, an arbitrary amount of the premix falls back and gets left in the conveyors. The amounts depend also on the temperature and viscosity of the constituents. These indeterminate amounts cause disturbance of the desired proportions of components when the machine is re-started for a fresh mix so that there is a reduction of quality, leading to inhomogeneity or so called "nests of weakness" which only react substantially later than the rest of the mixture.

This problem is particularly troublesome when the machine is used to prepare a lot of small mixes, ie it is operated with frequent starts and stops.

The object of the present invention is to overcome the above-discussed problems of known machines and the invention is characterised by the features set forth in the characterising part of claim 1.

The intermediate chamber accommodates variations in the level of the mixture in the mixing chamber and ensures that the mixture does not feed back into the outlets of the conveyors. The adjustable flow control means may be slide valves which make it possible to define the premix amounts which are fed from the conveyors into the mixing chamber. By means of variable control of the flow control means it is possible to set up any desired mixing regime.

The invention will be described in more detail, by way of example, with reference to the accompanying drawings, in which:

Fig 1 is a front elevation, partially in section, of a machine embodying the invention, and

Fig 2 is a side elevation of the machine, again partially in section.

The basic form of the illustrated machine is conventional and two auger conveyors 1 along side each other feed premixed moulding sand with resin and hardener respectively into a mixing chamber 2 having a rotary paddle mixer 3 therein. The means for driving the paddle mixer about its vertical axis are conventional

and are not shown. The fully mixed composition is withdrawn as required from the mixing chamber 2 by opening a slide valve 4 operated by a hydraulic or pneumatic actuator 5.

Each auger conveyor 1 has an outlet opening 6 but, in contrast to known machines, these outlets do not open directly into the top of the mixing chamber 2. An intermediate chamber 7 is interposed between the casing of the conveyors and the top of the mixing chamber 2, being attached by top and bottom flanges 8. The height of the intermediate chamber will depend upon the throughput of the mixer but should be at least 30 cm in order to ensure that no fully mixed material can feed back into either of the openings 6 even under the influence of the waves created by the paddle stirrer 3. This is true even when the mixing chamber is filled to its maximum level or when the maximum possible mixing time is employed before the valve 4 is opened. The intermediate chamber 7 can be of cylindrical form and is simply fitted between the conveyor housing and mixing chamber without the need for any major re-design.

Additionally, the outlets 6 from the auger conveyors 1 are provided with their own adjustable flow control means 9 illustrated as slide valves with sliding plates 10 operated by individual hydraulic or pneumatic actuators 11. An advantage of the illustrated lay out is that, simply by disconnecting the heads of the piston rods 12 from the valve plates 10 and swinging the actuators clear, the valve plates can be withdrawn and cleaned.

Each auger conveyor 1 comprises two augers with flights of opposite pitch. The rear auger (right hand auger in Fig 2) is the feed auger for the corresponding premix (sand-resin premix or sand-catalytic hardener premix). The front auger (left hand auger in Fig 2) is used solely to return any material which, due to the speed with which it is propelled by the right hand auger, might be thrown horizontally over the opening 6. If it were not for the left hand auger, this "spill" material would, after a time, become compacted and foul the smooth operation of the conveyor.

CLAIMS

1. Mixer for chemically bound moulding mixtures comprising a plurality of mixing conveyors feeding moulding material premixed with individual binder components to a mixing chamber wherein the separate streams of moulding material, and hence the binder components are mixed, characterised by an intermediate chamber (7) between the outlets (6) of the conveyors (1) and the mixing chamber (2) and adjustable flow control means (9) at the said outlets for regulating the streams flowing to the mixing chamber.
2. A mixer according to claim 1, characterised in that the intermediate chamber (7) has a height of at least 30 cm.
3. A mixer according to claim 1 or 2, characterised in that the flow control means (9) are slide valves.
4. A mixer according to claim 3, characterised in that each slide valve (9) has a valve plate (10) releasably connected to an actuator (11) which can be moved aside to permit the valve plate to be withdrawn for cleaning.

AMENDED CLAIMS
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CLAIMS

1. Mixer for chemically bound moulding mixtures, comprising a plurality of mixing conveyors feeding moulding material premixed with individual binder components to a mixing chamber wherein the separate streams of moulding material, and hence the binder components are mixed, characterised by an intermediate chamber (7) between the outlets (6) of the conveyors (1) and the mixing chamber (2) and adjustable flow control means (9) at the said outlets for regulating the streams flowing to the mixing chamber.
2. A mixer according to claim 1, characterised in that the intermediate chamber (7) has a height of at least 30 cm.
3. A mixer according to claim 1 or 2, characterised in that the intermediate chamber (7) is a straight cylinder.
4. A mixer according to claim 1, 2 or 3, characterised in that the flow control means (9) are slide valves.
5. A mixer according to claim 4, characterised in that each slide valve (9) has a valve plate (10) releasably connected to an actuator (11) which can be moved aside to permit the valve plate to be withdrawn for cleaning.

FIG. 1

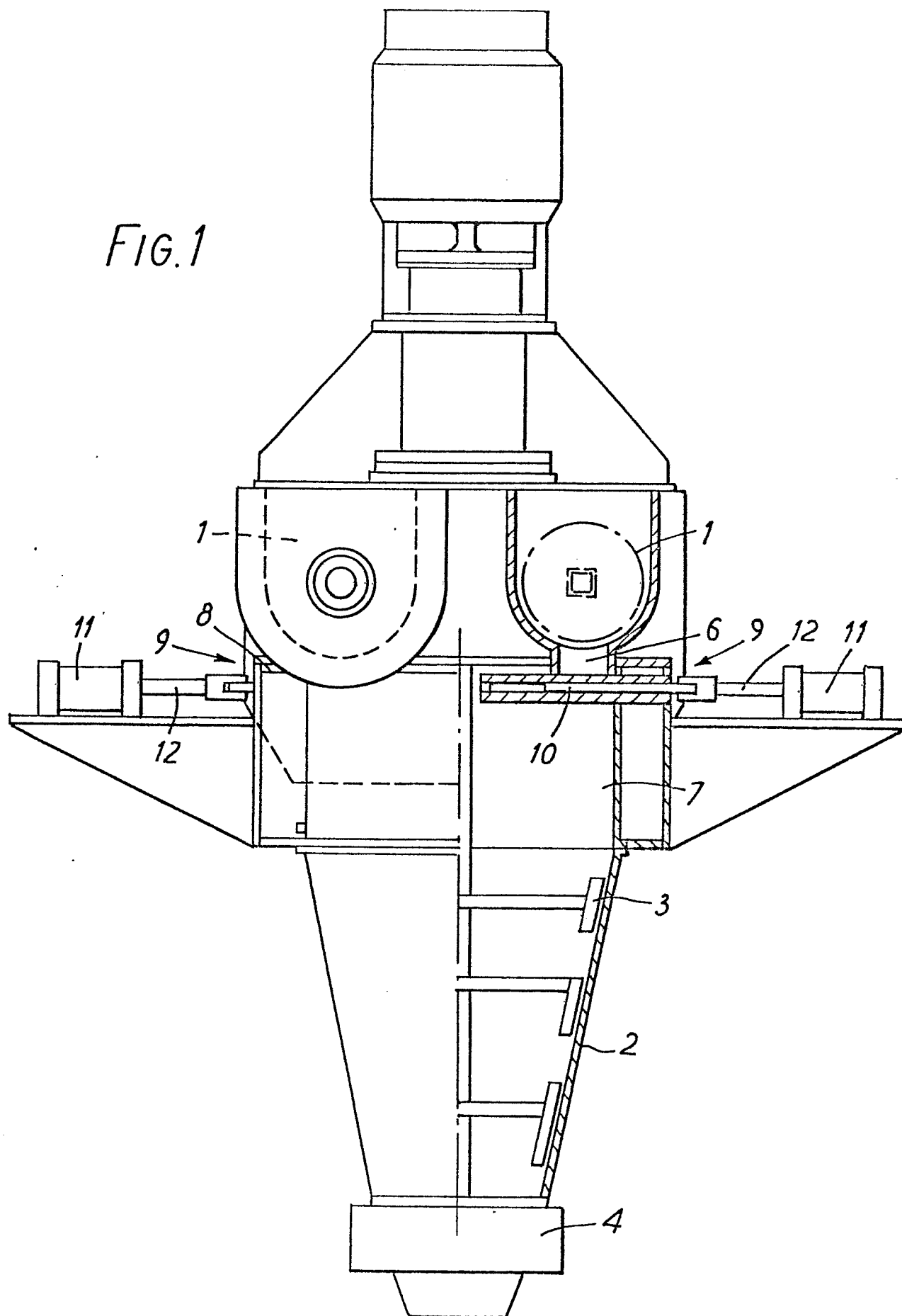
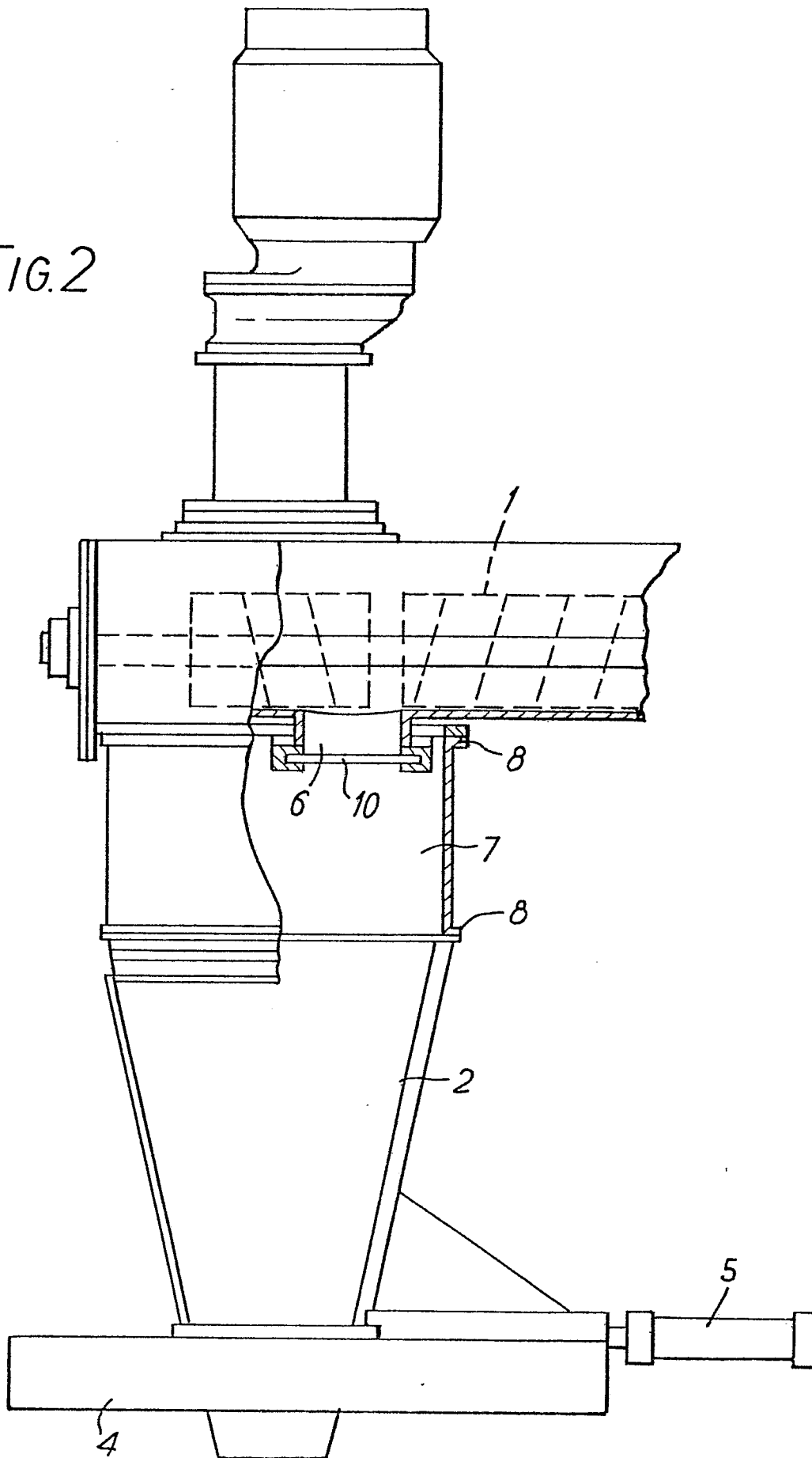


FIG. 2







European Patent  
Office

# EUROPEAN SEARCH REPORT

0062116  
Application number

EP 81 30 1445.3

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. <sup>3</sup> )
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<p>DE - B2 - 2 528 718 (FORDATH LTD.) * column 4, lines 37 to 44 * &amp; GB - A - 1 490 214 ---</p>	1	B 22 C 5/04
	<p>DE - A - 2 358 051 (FORDATH LTD.) * fig. 1, 3 * &amp; FR - A - 2 227 069 &amp; GB - A - 1 431 193 ---</p>	1	
A	<p>DE - B1 - 2 456 613 (G. FISCHER AG) * fig. 1 *</p>	1	TECHNICAL FIELDS SEARCHED (Int. Cl. <sup>3</sup> )
A	<p>AT - B - 336 816 (COMBUSTION ENGINEERING, INC.) * claim 2 *</p>	1	B 22 C 5/00
A	<p>US - A - 3 995 837 (PARSONAGE et al.) * fig. 1 to 3 *</p>	1	
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
Berlin	11-11-1981	GOLDSCHMIDT	