Nov. 22, 1955 W. E. EGERTON 2,724,336

MACHINE FOR DEPOSITING A VISCID MATERIAL IN CONTROLLED AMOUNTS

Filed Feb. 5, 1953 4 Sheets-Sheet 1

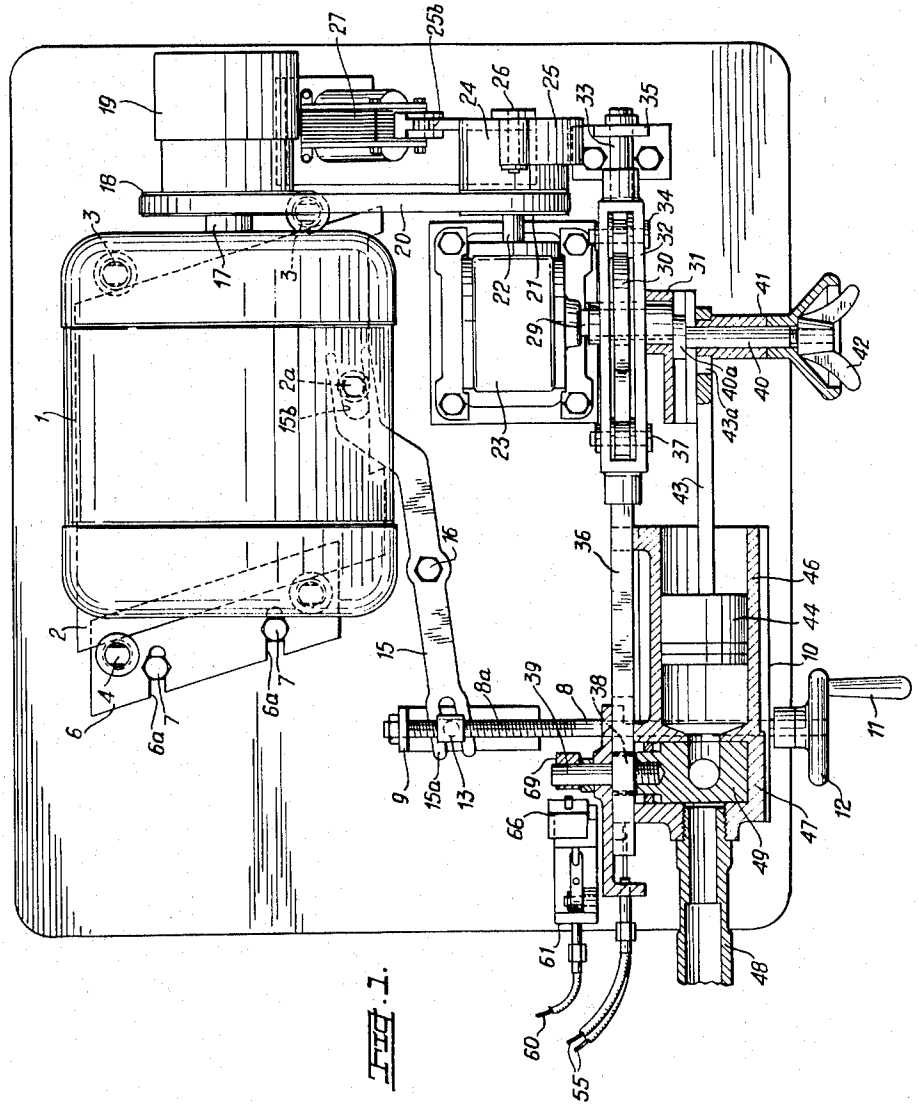


FIG. 1.

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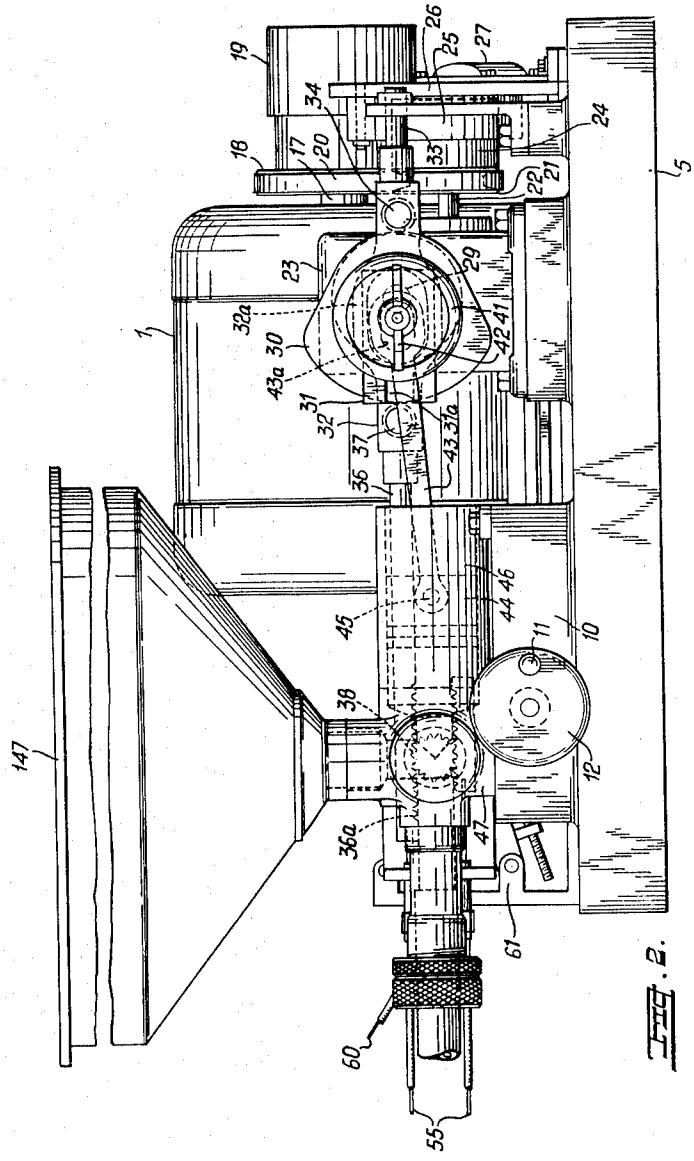


FIG. 2.

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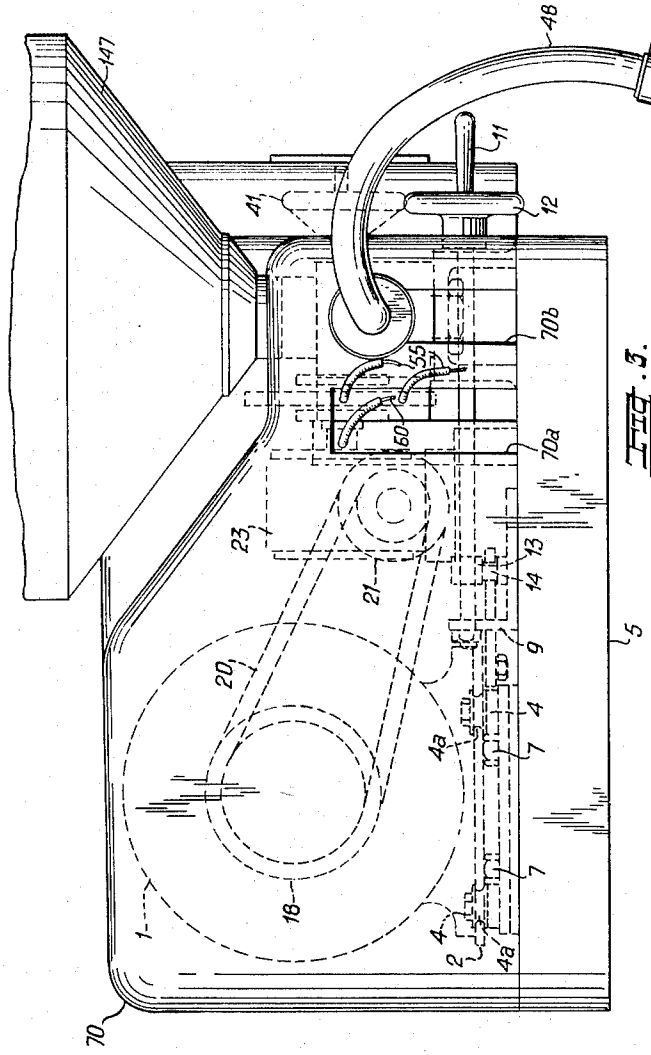


FIG. 3.

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MACHINE FOR DEPOSITING A VISCID MATERIAL IN CONTROLLED AMOUNTS

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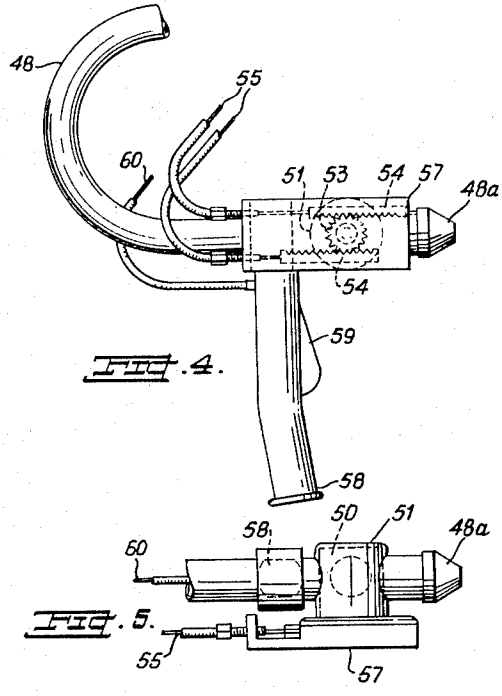


Fig. 4.

Fig. 5.

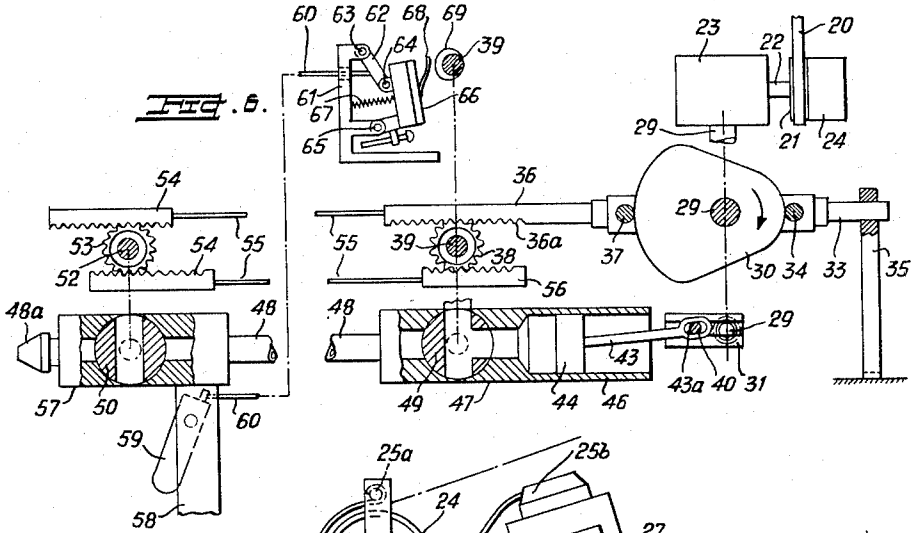


Fig. 6.

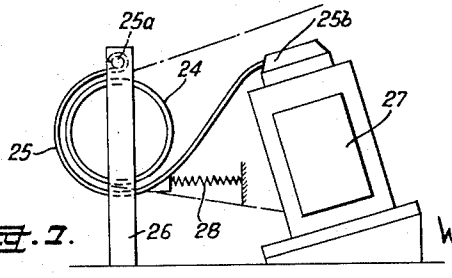


Fig. 7.

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2,724,336

MACHINE FOR DEPOSITING A VISCID MATERIAL IN CONTROLLED AMOUNTS

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Application February 5, 1953, Serial No. 335,332

1 Claim. (Cl. 103—25)

This invention relates to a machine for depositing a viscid material in controlled amounts and more especially to a machine which may be used either for depositing cake batter, sponge mixing, meringue or any similar type of material upon baking tins, prior to baking, or for depositing synthetic cream, butter bream, icing, jam or similar viscid types of material upon cakes or biscuits.

The commonly practical method of depositing viscid material upon baking tins or cakes involves the use of a Savoy bag. Viscid material, contained in a fabric bag is extruded in the required amount through a nozzle at the lower end thereof by means of pressure applied to the sides of the bag. In order to control the amount of material deposited from the bag, very considerable skill is required on the part of the operator.

An object of this invention is to provide a depositing machine capable of depositing a viscid material in efficiently controlled amounts in a manner substantially independent of the degree of skill of the operator.

According to the present invention, a machine for depositing a viscid material in controlled amounts comprises a delivery vessel, of a capacity substantially equivalent to the amount of material to be deposited, a valve or valves controlling communication between said delivery vessel and a reservoir for viscid material, and between said delivery vessel and a discharge pipe, a pump whereby viscid material is transferred from said reservoir to said delivery vessel and discharged from said delivery vessel via said discharge pipe, and means for synchronizing the operation of said pump with the opening and closing of said valve or valves.

In one form of the invention, the discharge pipe is provided, at the end thereof remote from the delivery vessel, with an additional valve, the opening and closing of which is synchronized with the operation of the pump.

In another form of the invention the depositing machine is provided with a flexible discharge pipe capable of being guided by the hand of an operator.

In the preferred form of the invention, the delivery vessel consists of a hollow cylinder in which a pump piston is slidably engaged.

The hollow cylinder may be provided at one end with a two-way rotary valve, in one position of which the cylinder is in communication with the reservoir, and in the other position, with the discharge pipe.

Reciprocation of the piston within the hollow cylinder may be effected by a prime mover which also operates the two-way rotary valve. Rotation of the valve to bring cylinder and reservoir into communication is effected when the piston reaches a position adjacent the valve, while cylinder and discharge pipe are brought into communication when the piston reaches a position remote from the valve. Compared with the gradual movement of the piston, the rotation of the valve is effected instantaneously.

An additional rotary valve may be disposed at the free end or ends of the discharge pipe remote from the cylinder and controlled by a pair of flexible cables from the aforementioned two-way rotary valve. One of these cables is provided for the purpose of opening the additional rotary valve; the other for closing it. Alternatively the remote end of the discharge pipe may be provided with a spring loaded valve operated by a single cable. Whether a spring loaded valve or an additional rotary valve is used, it is open only when the cylinder and discharge pipe are in communication.

In operation, viscid material is drawn into the cylinder from the reservoir by means of the suction stroke of the piston when the piston is receding from the valve. This material is then forced through the discharge pipe by means of the discharge stroke of the piston. The amount of material discharge depends on the length of the discharge stroke of the piston and means may be provided for varying this length.

If a rigid discharge pipe is used, each tin or cake must be moved under the free end of the discharge pipe to receive its quota of viscid material. With a flexible discharge pipe however, the free end of the pipe may be moved over each tin or cake prior to deposition of material.

The provision of a valve at the free end of the discharge pipe reduces the time which would otherwise need to be allowed for the viscid material to drain from the pipe by cutting off the flow of material as soon as the piston has reached the end of its discharge stroke. A valve is particularly applicable in the case of fillings and more particularly aerated fillings such as marshmallow and whipped cream which tend to "fell" and to drip from the free end of the discharge pipe unless such a valve is provided to effect an instantaneous cut-off.

The invention will now be further described with reference to the accompanying drawings in which—

Fig. 1 is a plan view partly in section of a machine for depositing a viscid material in controlled amounts.

Fig. 2 is a side elevation of the machine shown in Fig. 1,

Fig. 3 is an end elevation of the machine shown in Fig. 1,

Fig. 4 is a detail in plan of the control arrangements at the end of the discharge conduit shown in Fig. 3,

Fig. 5 is a side elevation of the detail shown in Fig. 4,

Fig. 6 is a diagrammatic representation of the machine illustrating the method of operation thereof, and

Fig. 7 is a diagrammatic representation of the solenoid and brake drum leaf assembly shown in Fig. 1.

Referring largely to Figs. 1–3:

An electric motor **1** is supported upon a base plate **2**, slidable in grooves **3***a* of guide bosses **3** and grooves **4***a* of bosses **4**. While bosses **3** are mounted directly upon a machine base **5**, bosses **4** are mounted upon an adjusting plate **6**, which is slotted at **6***a* to receive threaded bolts (not shown) projecting upwards from base **5** into threaded engagement with clamping nuts **7**. A threaded shaft **8**, having a threaded portion **8***a*, engages with a threaded bearing **9** and passes through a delivery vessel support **10**, which also acts as a bearing. Bearing **9** and support **10** are mounted upon base **5**. Threaded shaft **8** may be ro-

tated by means of a handle 11 on a wheel 12 mounted on one end of the shaft, and carries on portion 8*a* an internally threaded sleeve 13 having a dependent stud 14. A link 15, pivoted at 16 to base 5 is slotted at its ends 15*a*, 15*b* to engage with stud 14 and a stud projection 2*a* on base plate 2, respectively. Rotation of shaft 8 causes a displacement of motor 1 in a direction parallel to a line joining guide bosses 3 (or guide bosses 4).

Motor 1 drives a shaft 17 on which is mounted pulley 18 of a variable pulley assembly 19, supported on base 5. Driving band 20 links pulley 18 with a pulley 21 on shaft 22 of a reduction gear box 23 on base 5. Variable pulley assemblies such as 19 are well known. Displacement of the motor 1 by rotating shaft 8 so as to tighten band 20, causes band 20 to be recessed into a groove (not shown) in pulley 18 thus causing an effective decrease in the diameter of the pulley for driving purposes. At the same time, pulley assembly 19 compensates for the tendency of motor 1 to draw pulley 18 out of alignment with band 20 by maintaining pulley 18 in a constant position relative to pulley 21. Thus by turning handle 11, the rate at which shaft 22 is rotated, by power supplied by motor 1, may be controlled.

A drum 24 continuous with pulley 21 is surrounded by a brake drum leaf 25, the end 25*a* of which is attached to a stanchion 26 on base 5. The slackening of the brake drum leaf is achieved in moving the end 25*b* of the leaf by means of a solenoid 27, on base 5 (see also Fig. 7). A compression spring 28 is provided to restore the brake drum leaf to the 'on' position when the solenoid is not exerting an attraction on end 25*b* of the drum leaf.

A common driving shaft 29, driven through reduction gear box 23 by shaft 22, carries a cam 30 and a crank member 31, giving rise to a cam assembly and a crank assembly respectively, and being rigidly mounted on said shaft.

Referring first to the cam assembly cam 30 is disposed partially within a band member 32 which is loosely mounted on shaft 29 which passes through a slot 32*a* of member 32. A bar 33, rigidly bolted at 34 to band member 32 is slidable in a bearing 35 mounted on base 5. A rack bar 36, rigidly bolted at 37 to band member 32 is toothed at 36*a* to engage with a toothed sprocket 38 on a rotary valve shaft 39.

Referring now to the crank assembly, crank member 31 is in the form of an open ended envelope having a gap 31*a* in one face. The edges of the gap retain the head 40*a* of a shank 40 which passes through the gap. A sleeve 41 surrounds shank 40, and, by means of pressure supplied to sleeve 41 by rotating a wing nut 42 threaded onto shank 40, shank 40 may be secured in the desired position within the envelope of crank member 31. Shank 40 and sleeve 42 pass through slot 43*a* of a link 43.

A pump piston 44, pivoted at 45 to link 43, is slidable in a cylindrical delivery vessel 46 on delivery vessel support 10. A valve chamber 47 communicates with delivery vessel 46, a reservoir 147 and a flexible discharge conduit 48 terminating in a nozzle end 48*a*. A two way rotary barrel valve 49, disposed in valve chamber 47, is mounted on shaft 39.

A one way rotary barrel valve 50 (see Figs. 4, 5 and 6), in a valve housing 51 disposed at the nozzle end 48*a* of discharge conduit 48 remote from valve chamber 47, is mounted upon a stub shaft 52, bearing a toothed wheel 53, engaging with toothed rack bars 54, connected by sheathed cables 55 to rack bar 36 and a rack bar 56, engaging with toothed wheel 38. Stub shaft 52 is housed in a bearing 57 attached to valve housing 51.

A handle 58 (Figs. 4, 5 and 6), attached to discharge conduit 48, supports a spring loaded lever 59 which actuates a sheathed cable 60, which is attached, after passing through a support member 61, on base 5, to a lever 62, pivoted at 63 to member 61. Pivot pins 64, 65 connect lever 62 and member 61 to a microswitch support member 66, actuated by a compression spring 67, disposed between member 66 and member 61. A microswitch 68 on support member 66 is operated by contacting a cam 69 on shaft 39.

A cover 70 (Fig. 3) for the machine is cut away at 70*a*, 70*b* to permit passage therefrom of cables 55 and 60 and discharge conduit 48. Discharge conduit 48 may be wire wound as at 71 to provide reinforcement.

In using the machine (see particularly Fig. 6), an operator grips handle 58, and depresses spring loaded lever 59 which actuates cable 60 causing microswitch 68 to be drawn clear of cam 69. In this free position, microswitch 68 starts motor 1 which rotates common driving shaft 29 through reduction gear box 23. At the same instant as motor 1 is started, solenoid 27 is brought into action freeing drum 24 from the encircling grip of brake drum leaf 25, thus permitting rotation of pulley 21 and hence of shaft 29. Rotating cam 30 on shaft 29 imparts a reciprocating motion to rack bar 36. It will be seen from the configuration of cam 30 that the motion imparted to rack 36 will consist of a series of jerks rather than a gradual movement. The motion of rack bar 36 is transmitted by toothed wheel 38 to shaft 39 and two way rotary valve 49, and also by one or other of cables 55 if necessary by way of rack bar 56 to one or other of rack bars 54 which operate one way rotary valve 50 through toothed wheel 53 and shaft 52. Shaft 29 also rotates crank member 31, causing pump piston 44 to reciprocate. The length of the stroke of the piston may be varied by varying the position of shank 40 with respect to shaft 29 using wing nut 42 (see previously). As is indicated in Fig. 6 of the drawings, when piston 44 is receding from valve 49, valve 49 is in a position connecting reservoir 147 and delivery vessel 46 while valve 50 is in a closed position. A charge of viscid material is thus drawn into delivery vessel 46. Similarly when piston 44 is approaching valve 49, valves 49 and 50 are in positions connecting the delivery vessel with the discharge conduit 48 and the nozzle end, and the charge of material is discharged from the machine. In Fig. 6, rotation of shaft 29 should be considered in a clockwise direction.

It is desirable when the operator releases lever 59 to stop the running of motor 1 that shaft 29 ceases to rotate when valve 50 is in the closed position (as in Fig. 6). When lever 59 is released, compression spring 67 forces microswitch 68 towards shaft 39. Shaft 39 must rotate until cam 69 engages with microswitch 68, depressing the latter and simultaneously stopping the running of motor 1 and releasing end 25*b* of brake drum leaf 25 from the attraction of solenoid 27, when compression spring 28 causes brake drum leaf 25 to grip drum 24. Cam 69 is so positioned on shaft 39, that valve 50 is in the closed position when cam 69 depresses the microswitch 68. The electrical connections between the microswitch and the motor and solenoid are omitted in the drawings since such connections are well known in the electrical art.

I claim:

A machine for depositing a viscid material in controlled amounts comprising in combination a delivery vessel, of a capacity substantially equivalent to the amount of material to be deposited, a discharge conduit leading from said delivery vessel, a reservoir for viscid material communicating with the junction between said delivery vessel and said discharge conduit, a rotatable valve member mounted in said junction upon a rotatable shaft adapted to alternate between predetermined positions in one of which the delivery vessel is in communication with the reservoir via said valve member and in the other of which the delivery vessel is in communication with the discharge pipe via said valve member, a pump piston slidable within said delivery vessel, means to reciprocate said piston and to alternate said rotatable shaft in timed relationship with one another, a rotatable valve member mounted in the outlet end of the dis-

charge conduit, means to synchronize the rotation of said rotary valve members, a control lever adapted to be depressed and mounted at the outlet end of the discharge conduit, a microswitch mounted adjacent said rotatable shaft adapted to start and, on depression, to stop the alternation of said shaft, a connection between said lever and said microswitch, and a cam positioned on said rotatable shaft to depress said microswitch when the valve in the discharge pipe outlet is in the closed position.

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