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APPARATUS AND PROCESS OF PRODUCING
CALENDERED LINOLEUM MATERIALS
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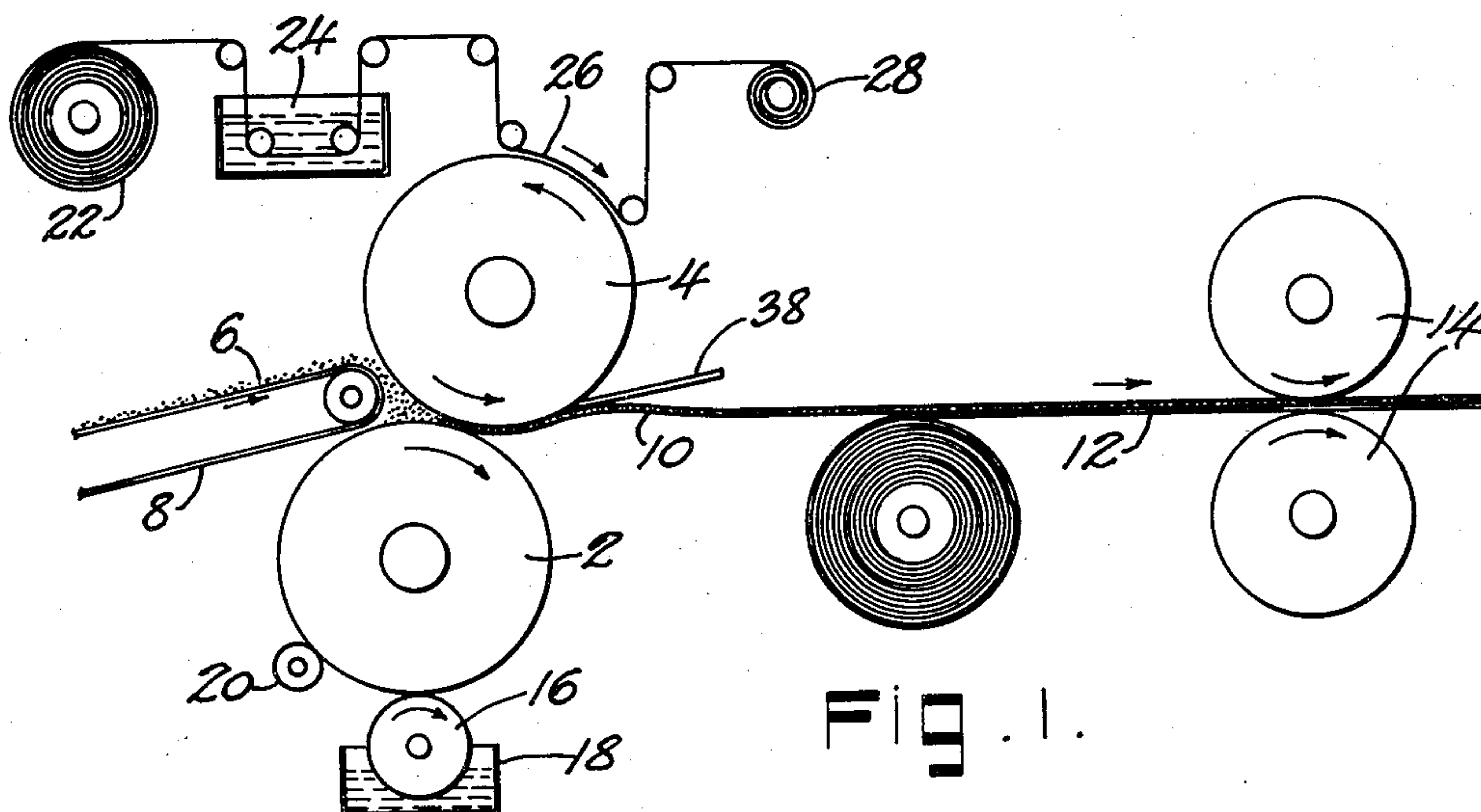


Fig. 1.

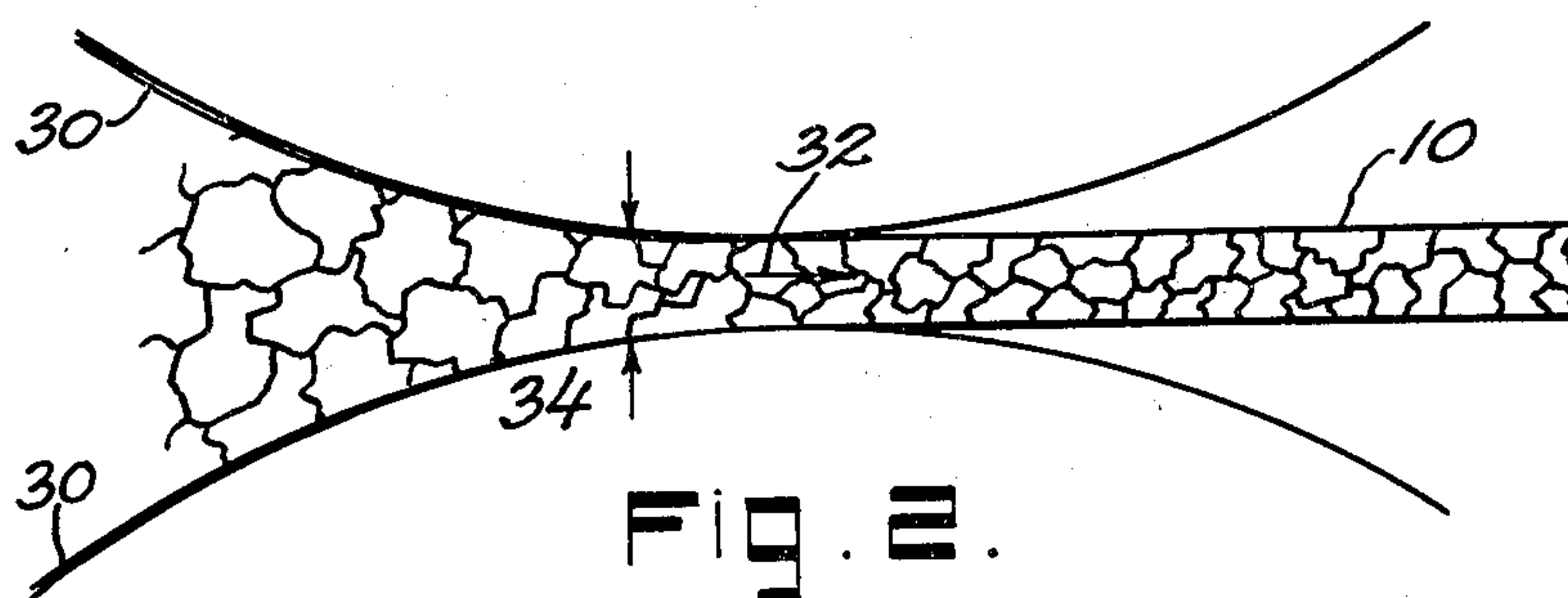


Fig. 2.

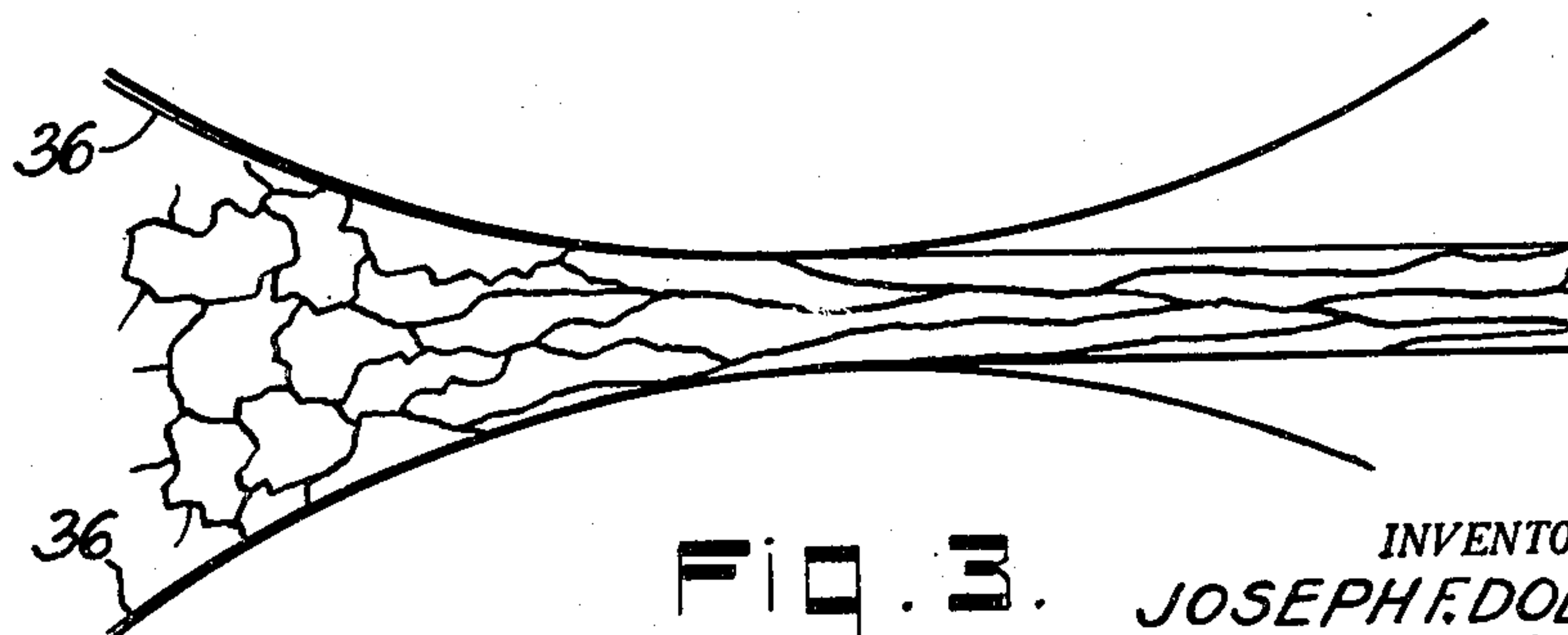


Fig. 3.

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APPARATUS AND PROCESS OF PRODUCING CALENDERED LINOLEUM MATERIALS

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11 Claims. (Cl. 18—2)

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This invention relates to methods of producing linoleum products.

It has been common heretofore to produce linoleum products having a granite type design wherein differently colored particles are individually recognizable and are present in the design in substantially undistorted form. Such products are produced by depositing a layer of differently colored particles, varying in size from about $\frac{1}{16}$ to $\frac{1}{4}$ of an inch, upon a web of suitable backing material to a depth of say an inch or more. The assembly is then pressed in a flat press to compress the particles and bond them to each other and to the backing material. However, only a limited area of material may be pressed at one time and the pressure to which the material is subjected is also limited. The operation is therefore slow and expensive to carry out. Moreover, the difficulty encountered in distributing the particles uniformly throughout the area to be pressed renders it practically impossible to maintain accurate control of the thickness or gauge of the product. Furthermore, laterally adjacent particles are not generally bonded together very effectively and as a result the product is relatively porous and uneven and is notorious for its tendency to catch and retain dirt.

Products having a streaked, jaspe or marble-type design have been produced in a continuous operation by feeding differently colored particles of linoleum composition to a calendar wherein the rolls rotate at different speeds and are maintained at different temperatures. However, the particles are so stretched and distorted during the calendaring operation that they are not individually recognizable and the character of the final design is altogether different from that of granite type products.

In accordance with the present invention products having a granite type design are produced in a continuous operation and at considerably less cost than heretofore. Furthermore, the resulting product has a much more uniform thickness and presents the smoothness and continuity of surface which characterizes calendered linoleum products and reduces their tendency to catch and retain dirt.

The advantages of the present invention are attained by feeding granulated linoleum composition to a calendar wherein both rolls of the calendar are rotating at substantially the same speed and at the same time the calendar rolls are continuously washed or cleaned so that they present fresh, somewhat lubricated, surfaces to

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the composition being calendered. The particles therefore are free to slip or adjust their positions with respect to the rolls as they advance and are pushed or crowded through the nip of the rolls. For this reason a minimum of distortion, stretching or elongation of the particles takes place. The particles are however, compressed and compacted as they pass through the nip of the calendar rolls so as to cause them to be bonded together into a unitary sheet without being so distorted or elongated as to lose their identity and general form. At the same time the gauge or thickness of the product can be accurately controlled and the surface of the sheet presents a characteristic smooth, calendered appearance.

The sheet of linoleum composition thus obtained may be bonded to a layer of backing material in the usual manner by means of a continuous or intermittent pressing operation.

One of the objects of the present invention is to provide an improved process for producing linoleum products wherein individual particles or pieces of differently colored material are readily identifiable.

Another object of the present invention is to provide a continuous process for producing linoleum products having a granite type design.

A further object of the invention is to provide a novel method for calendaring linoleum compositions.

Another object of the invention is to provide granite type linoleum products presenting a calendered surface.

These and other objects and features of the present invention will appear from the following description thereof in which reference is made to the figures of the accompanying drawing.

In the drawing:

Fig. 1 is a diagrammatic illustration of a typical form of mechanism adapted for use in the practice of the present invention, and

Fig. 2 is an enlarged sectional view of a calendar illustrating the present method of operation, and

Fig. 3 is a similar view illustrating the calendaring methods of the prior art.

The apparatus illustrated in Fig. 1 shows a typical construction adapted for use in the practice of the present invention wherein there is a lower calendar roll 2 and an upper calendar roll 4 to which granules or small pieces of linoleum composition 6 are fed by means of a conveyor 8. The composition emerging from the calendar rolls is in the form of a continuous sheet as indicated at 10 and this sheet is applied to the surface of

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a web of backing material 12 after which the assembled sheeted linoleum composition and backing material are passed to a press indicated generally at 14.

The advantages of the present invention are attained by providing the rolls of the calender with means for effectively cleaning the surface of the rolls after they disengage the sheeted linoleum composition 10 and before they again are brought into contact with granules of linoleum composition 6 fed to the nip of the calender rolls. Any suitable form of cleaning means may be employed and as shown in Fig. 1 the roll 2 is engaged by a rotating brush 16 which is supplied with cleaning fluid from the receptacle 18. The wiping roll 20 engages the face of the calender roll 2 after it has been cleaned by the rotating brush 16. Thus the roll is actually washed to present a clean, bright surface.

In the alternative as shown in connection with the calender roll 4 a sheet of material such as fabric or paper toweling is passed from a roll 22 through a bath of cleaning fluid 24 and then is pressed in contact with the face of the calender roll as shown at 26 and finally is wound up on the roll 28. The web of material engaging the calender roll 4 travels in the direction opposite to movement of the surface of the calender roll and may be oscillated or otherwise moved to insure effective cleaning of the surface of the roll prior to contact thereof with the granules of material being calendered.

During such cleaning of the rolls a thin film of the cleaning composition indicated at 30 in Fig. 2 adheres to the surface of the rolls or a separate film of lubricant may be applied whereby the freshly cleaned surface of the rolls are brought into contact with the granules of material so that they are pushed or crowded through the nip of the calender without appreciable adhesion to the rolls. Some slippage or relative movement of the calender rolls with respect to the granules of the material apparently takes place and the granules are crowded together and compacted instead of being drawn out and pulled through the nip of the rolls. Thus as shown in Fig. 2 the granules are pushed through the calender and compressed in a direction parallel to the plane of the resulting sheet as indicated by the arrow 32. At the same time they are compressed in a direction normal to the plane of the sheet as indicated by the arrows 34. Compression of the granules and bonding thereof to each other is thereby effectively accomplished without excessive distortion or elongation of particles during the calendering operation. The resulting sheeted linoleum composition 10 emerging from the calender presents a granite type design wherein the individual particles or pieces of linoleum composition can be identified and clearly distinguished while they are securely bonded together into an integral sheet.

The present method of calendering linoleum compositions is in striking contrast with prior methods represented by Fig. 3 wherein the calender rolls are not washed or thoroughly cleaned after they disengage the calendered sheet and before they are brought into contact with additional linoleum composition. Under such conditions a thin film or haze of linoleum composition or "cement" 36 adheres to the surface of the calender rolls and as a result the granules of linoleum composition passing to the nip of the calender tend to stick to the rolls and are pulled through the nip of the calender so as to be drawn

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out into streaks as indicated very clearly in Fig. 3. The composition is thus positively moved and drawn out so that it is placed under tension as it passes through the nip of the rolls instead of being pushed and crowded so as to be compressed in the plane of the sheet during the calendering operation as in the present invention. The product emerging from the calender rolls in prior calendering operations therefore presents a streaked, jaspe or mottled design whereas the applicant's product presents a characteristic or granite type of design having an entirely different appearance. At the same time applicant's product has the characteristic smoothness and continuity of surface which characterize calendered products despite the fact that the particles of the composition are present in a relatively undistorted form.

The manner of operating the calender in the practice of the present invention may vary considerably and it is generally preferable to rotate both the calender rolls at the same speed. The sheeted product tends to follow the upper roll and may be stripped from the roll by means of a doctor blade as shown at 38. However, the temperatures and speed of the rotation of the rolls may be varied depending upon the composition of the linoleum material, the amount of cement which it contains and the temperature and density of the granules themselves as they are fed to the nip of the calender.

The character of the cleaning composition employed is preferably such as to serve also as a mild lubricant but it is most important that it shall rapidly dissolve or wash off and remove any film of linoleum composition or cement from the surface of the rolls. Typical cleaning compositions which have been used are hydrocarbon solvents such as kerosene or preferably "safety solvent" which is a petroleum derivative in the nature of a refined kerosene having a high flash point. However other cleaning compositions have been used including such materials as a slurry of cleaning powder (Bon Ami), soaps and solutions of synthetic detergents.

The type of calender employed can be varied considerably but it is important that the calender rolls should present highly polished surfaces since it has been found that even a thin film or haze of rust on the surface of the calender such as that formed after they have stood idle for a few days may be sufficient to cause undesired adhesion of the granules of composition to the rolls so as to cause excessive distortion of the material. The thickness or gauge of the resulting sheeted product also can be varied and products having a typical granite like design have been produced wherein the calendered sheet of linoleum composition is no more than .030 inch in thickness. However it is found that there is less tendency to distort or elongate the granules of material when the calender rolls are spaced somewhat farther apart and the resulting calendered sheet is correspondingly thicker. It is easier and preferable to produce granite type products wherein the calendered sheet is from about .050 to .125 inch in thickness.

After the linoleum composition has emerged from the calender the sheeted material may be applied to a web of any suitable type of backing material such as saturated felt, burlap or the like. The web of backing material carrying the sheeted linoleum composition is then passed to a press where it is subjected to heat and pressure to bond the sheeted composition to the backing. The type of press employed may be varied and

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it is of course possible to employ either an intermittently operated flat press or a continuously operating rotary press. The resulting product is thereafter cured or dried and handled in the conventional manner in the manufacture of linoleum floor coverings.

By reason of the intimate bonding of the granules or particles of linoleum composition during their passage through the nip of the calender in forming the sheet linoleum composition, the finished product is considerably more dense and uniform in thickness than are granite like products produced heretofore. At the same time the product has the characteristic smoothness and continuity of surface of calendered linoleum products and therefore may be easily cleaned and does not tend to collect and retain dirt in a manner of prior granite type linoleum products.

While the present invention is particularly adapted for use in forming granite type linoleum the character of the design in the finished product may be varied considerably depending upon the size and character of the particles or pieces of linoleum composition fed to the calender. Therefore the present invention lends itself to the production of linoleum products having quite unusual and characteristic designs by reason of the use of both relatively large and small granules in the same mix.

These and other variations and changes may be made in the manner of employing the present invention and in the type of material being treated. In view thereof it should be understood that the particular equipment and methods of operation herein described are intended to be illustrative only and are not intended to limit the scope of the invention.

I claim:

1. The method of producing a calendered sheet of linoleum composition which comprises the steps of feeding linoleum composition to a pair of rotating calender rolls, separating the resulting calendered sheet from said rolls, applying a cleaning agent to at least one of the rolls from which the sheet has been separated, and thereafter removing said agent and any remaining linoleum composition adhering to said roll in advance of the point of contact of said roll with said composition whereby said roll continuously presents a freshly cleaned surface to the composition being calendered.

2. The method of producing a calendered sheet of linoleum composition which comprises the steps of feeding linoleum composition to a pair of rotating calender rolls, separating the resulting calendered sheet from said rolls, applying a cleaning agent to both of the rolls from which said sheet has been separated, and thereafter removing said agent and any remaining linoleum composition adhering to said rolls in advance of the point of contact of said rolls with said composition whereby said rolls both continuously present freshly cleaned surfaces to the composition being calendered.

3. The method of producing a calendered sheet of linoleum composition which comprises the steps of feeding linoleum composition to a pair of rotating calender rolls, separating the resulting calendered sheet from said rolls, applying a solvent for the linoleum composition to at least one of the rolls from which the sheet has been separated, and thereafter removing said solvent and any remaining linoleum composition from said roll in advance of the point of contact of said roll with said composition whereby said roll

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continuously presents a freshly cleaned surface to the composition being calendered.

4. The method of producing a calendered sheet of linoleum composition which comprises the steps of feeding linoleum composition to a pair of rotating calender rolls, separating the resulting calendered sheet from said rolls, applying a solvent for the linoleum composition to both of the rolls from which the sheet has been separated, and thereafter removing said solvent and any remaining linoleum composition from said rolls in advance of the point of contact of said rolls with said composition whereby both rolls continuously present freshly cleaned surfaces to the composition being calendered.

5. A method of producing a calendered sheet of linoleum composition which comprises the steps of feeding linoleum composition to a pair of rotating calender rolls, separating the resulting calendered sheet from said rolls, moving a member carrying a cleaning agent into engagement with the surface of at least one of the rolls from which the sheet has been separated, and wiping said roll to remove the cleaning agent and any adhering linoleum composition from the surface of said roll in advance of its point of contact with said composition whereby said roll continuously presents a freshly cleaned surface to the composition being calendered.

6. A method of producing a calendered sheet of linoleum composition which comprises the steps of feeding linoleum composition to a pair of rotating calender rolls, separating the resulting calendered sheet from said rolls, moving a member carrying a cleaning agent into engagement with the surfaces of both of the rolls from which said sheet has been separated, and wiping said rolls to remove the cleaning agent and any adhering linoleum composition from the surfaces of said rolls in advance of their points of contact with said composition whereby said rolls both continuously present freshly cleaned surfaces to the composition being calendered.

7. A method as set forth in claim 1 in which the cleaning agent employed is kerosene.

8. A method as set forth in claim 1 in which the cleaning agent comprises a lubricant.

9. The method of producing a sheeted linoleum product having a granite type design which comprises the steps of feeding a mixture of differently colored granules of linoleum composition to a pair of calender rolls, separating the resulting sheeted product from said rolls, applying a cleaning agent to the rolls from which the sheet has been separated and removing said cleaning agent from the rolls before the rolls contact additional granules of composition so that both rolls continuously present freshly cleaned surfaces to the granules of linoleum composition being calendered.

10. Mechanism for producing a calendered linoleum product comprising a pair of rotatable calender rolls, means for separating a calendered sheet from said rolls, means located adjacent at least one of said rolls for applying a cleaning agent to said roll, and means for removing such agent and any adhering composition from the roll to which said agent is applied so as to cause said roll continuously to present a freshly cleaned surface to composition calendered by said rolls.

11. Mechanism for producing a calendered linoleum product comprising a pair of rotatable calender rolls, means for separating a calendered sheet from said rolls, means located adjacent each of said rolls for applying a cleaning agent

thereto and means for removing such agent and any adhering composition from said rolls so as to cause both rolls continuously to present freshly cleaned surfaces to composition calendered thereby.

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