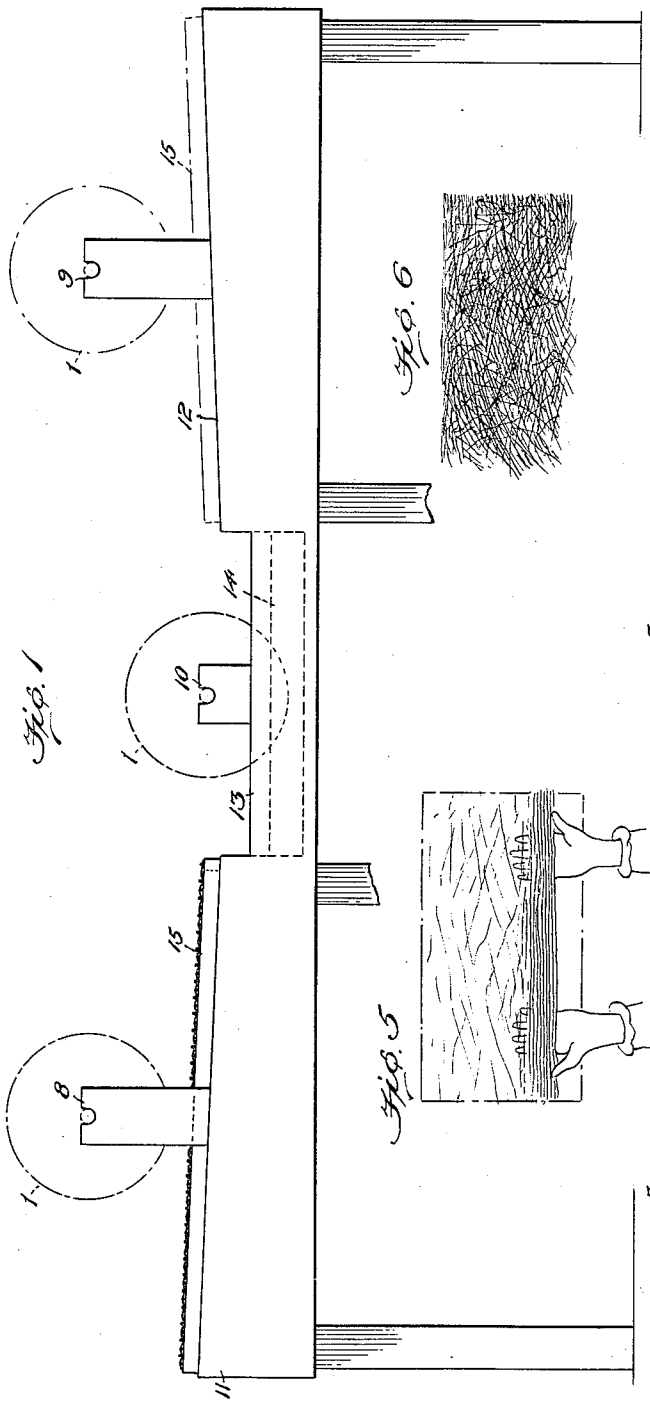
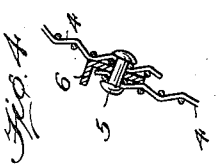
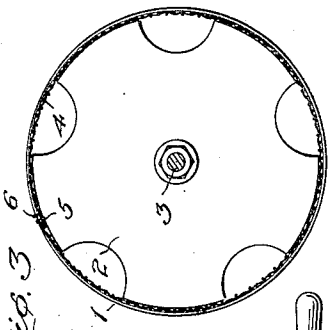
May 5, 1931. P. O. E. FRIEDRICH 1,804,254

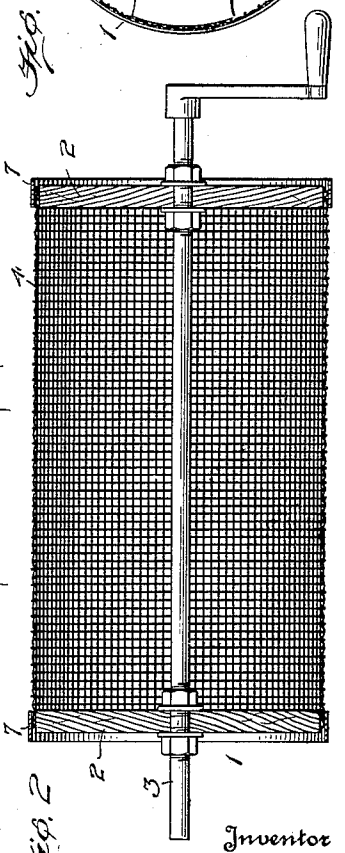
METHOD OF MAKING GLASS WOOL SHEETS

Filed Jan. 25, 1927









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Patented May 5, 1931 1,804,254

UNITED STATES PATENT OFFICE

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METHOD OF MAKING GLASS WOOL SHEETS

Application filed January 25, 1927. Serial No. 163,387.

An object of my invention is to provide a method for making sheets of glass filaments which shall be of substantially uniform porosity and thickness.

Another object of my invention is to provide a method for providing a substantially uniformly felted sheet of vitreous material formed of a pluralty of layers of interlaced fibers united by a binder to make a sheet that will stand handling without injury.

A further object of my invention is to provide a method of making felted sheets of spun glass in which the desired porosity, thickness and density can be controlled.

With these and other objects in mind, my invention resides in the various steps and combinations of steps in the method set forth in the following specification and illustrated in the accompanying drawings in which:

Figure 1 is a side elevation of a work table on which the work may be done.

Figure 2 is a longitudinal sectional view of a rotatable cylinder on which the fibers may be distributed.

Figure 3 is a transverse sectional view of a cylinder or drum on which the sheets may be formed.

Figure 4 is an enlarged section of a joint in the wire covering of the cylinder showing the edge on which the sheet may be cut.

Figure 5 is a sketch showing how the individual filaments may be fed on to the rotatable cylinder.

Figure 6 is an enlarged corner of a finished sheet showing the felting of the fibers.

Referring to the drawings in detail, in order to illustrate the principles of my method, the simplest equipment has been used in which 1 is a drum which may comprise the perforated end boards 2 mounted on the axle 3 supporting the cylinder of wire screen 4. Where the edges of the wire come together, they may be united as shown in Figure 4 by means of the bolts or rivets 5 and the angle iron 6. This angle iron may serve the double purpose of acting as a guard for the loose ends of the wire screen 4 and as a guide for a suitable cutter employed for the removal of the mat or sheet. Likewise, the end boards 2 and the wire screen 4 may be surrounded by the bands 7 which serve to guide the filaments on to the screen and provide a cutting edge for trimming off projecting ends of filaments. When a cylinder or drum 1 is used, its circumference and length may be selected to correspond to the length and width of the sheet or mat of glass wool to be made. It is, therefore, desirable that the bearings or supports 8, 9 and 10 of the work tables 11 and 12 and the tank 13 be spaced or adjusted to conveniently support the cylinders used.

In carrying out my method, the cylinder 1 may initially be mounted on the bearings or supports 10 and rotated in the bath of adhesive material 14. It will be understood, however, that it is not essential to first coat the cylinder since the roughened surface of the cylinder will act to draw out the filaments as hereinafter described whether or not an adhesive material is initially applied to the same. It might also be pointed out that as the cylinders are used successively they will, after the first complete cycle, be permeated or coated with the adhesive binder whether initially coated or not. During the process of feeding the filaments to the cylinder it is preferably mounted on either the bearings or supports 8 or 9. The operator may then take a given amount, mass or bundle of the filaments which are preferably arranged in parallel relation and which, prior to this step in the method, have been heated so as to reduce to a minimum the cohesion of the individual filaments one to another. The filaments are preferably substantially equal in length to the length of the cylinder to avoid waste in the operation, the trimming guide hereinbefore described enabling the operator to correctly determine the length of the finished sheet. The filaments may be fed to the cylinder in the manner illustrated in Figure 5. As the individual filaments come in contact with the cylinder, they adhere thereto and are drawn out from the mass or bundle to form a series of interlacing bows or loops which in turn draw other filaments out from the mass held in the hands of the operator so that the cylinder may be covered by a number of thin layers of interlacing filaments to form a felt-like sheet as

illustrated in Figure 6. It is to be noted that as long as the filaments are distributed relatively uniformly, the relative density or porosity is but slightly affected by the number of layers applied in the manner described, for the same total amount of material is distributed to cover the same surface area and each succeeding layer tends to equalize any inequalities in distribution occurring in the previous layers.

When the given amount of filaments has been distributed on the cylinder 1 as above described, it may be removed from the supports 8 or 9 and again placed on the supports 10. The cylinder with its sheet of filaments may then be rotated in the bath 14 to thoroughly saturate or impregnate the sheet with adhesive. The openings in the end boards 2 and the reticulated character of the cylinder will permit the adhesive 14 to penetrate the sheet from both sides. The cylinder 1 may then be returned to the supports 8 or 9 and the projecting ends of filaments removed by running a suitable rod, knife or other instrument around the inner edge of the band 7. The sheet may then be cut by running a knife or rod along the straight edge or guide 6 after which it can be readily removed on to the draining or handling tray 15 where it may be allowed to dry. At any stage in the drying, if desired, the sheet may be rolled or otherwise pressed to insure the desired degree of density.

If the sheet or mat is to be used as a filter, it may be desirable to use an adhesive which is soluble in the liquid which is to be filtered or an adhesive may be used which is itself a filtering medium in which case the filaments act as an inert agency for holding the filtering medium.

As stated above, only the simplest equipment has been used to illustrate the steps in my method. Instead of feeding the filaments by hand, on to the hand turned cylinder, a number of well known devices may be used to feed the filaments uniformly on to the cylinder at a uniform rate in relation to the rotation of the cylinder. Instead of allowing the sheets to drain on trays as described above, the excess adhesive may be removed by rotating the cylinder rapidly.

There are two general methods of making glass wool or similar filaments. One is to spin the filaments from a molten surface by means of a rapidly revolving wheel. The other is to allow a fine stream of molten glass to flow through or into a stream of air under high pressure. If the sheets to be made are to be used as filter or for a purpose in which the control of porosity is a factor, I prefer to use filaments of substantially the same diameter, as made by the first method, for, by selecting filaments of the proper diameter and the amount of such filaments to be used in making a sheet of a given area, I can control the degree of porosity of the final product.

Having now described my invention, I claim:

1. The method of making glass wool sheets including distributing glass filaments from a substantially parallel initial bundled relation on to a moving surface to form a felted sheet of fortuitously interlaced filaments.

2. The method of making fibrous sheets of vitreous material including haphazardly distributing on a moving surface initially bundled vitreous filaments to form a sheet of substantially uniform porosity.

3. The method of making a matted sheet of vitreous material comprising heating the vitreous filaments to reduce the cohesion thereof, feeding the filaments onto a moving surface having a direction of movement transverse with respect to the filaments whereby the filaments will individually adhere to the moving surface and be pulled out from bundled relation to arrange themselves in haphazard interlaced fashion upon the surface, and impregnating the mass of interlaced filaments with a binder to effect permanent union.

4. The method of making a matted sheet of vitreous material comprising heating the vitreous filaments to reduce the cohesion thereof, feeding the filaments onto a moving surface having a direction of movement transverse with respect to the filaments whereby the filaments will individually adhere to the moving surface and be pulled out from bundled relation to arrange themselves in haphazard interlaced fashion upon the surface, impregnating the mass of interlaced filaments with a binder to effect permanent union, applying pressure to the mass to compress it to the desired thickness and density, and drying the same.

5. The method of making a matted sheet of vitreous material comprising initially supporting vitreous filaments in bundled form, feeding the filaments onto a moving surface having a direction of movement transverse with respect to the filaments whereby the filaments will adhere to the moving surface and be pulled out from their bundled relation to arrange themselves in haphazard interlaced fashion upon the surface.

In testimony whereof I affix my signature.

PAUL O. E. FRIEDRICH.