

June 30, 1953

L. PARKER

2,643,487

METHOD OF PRODUCING BATTS OF SILICA FIBERS

Filed March 23, 1951

2 Sheets-Sheet 1

Fig. 1.

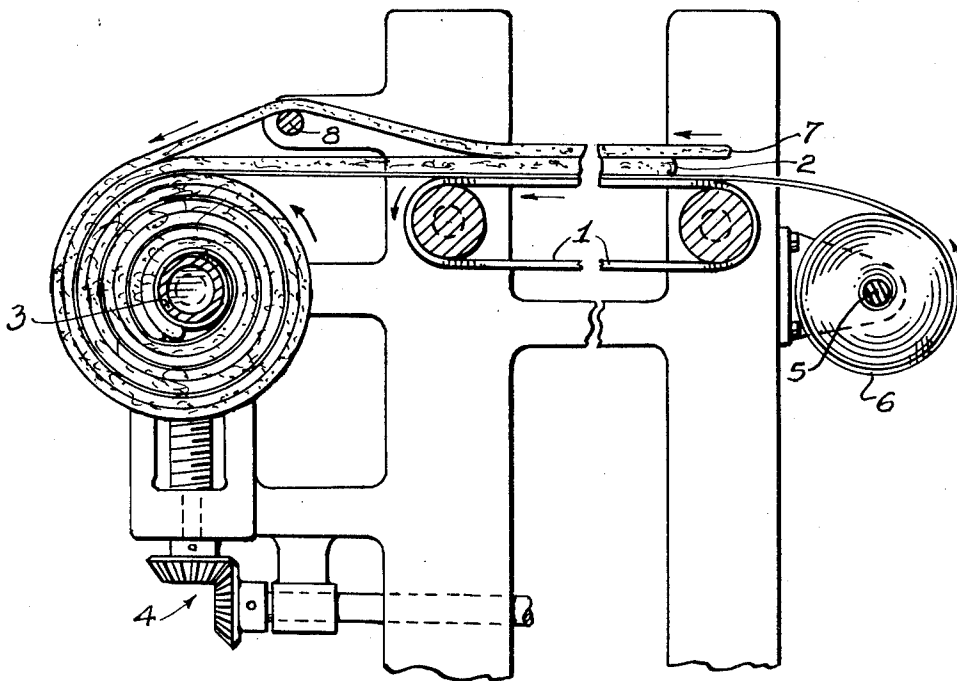
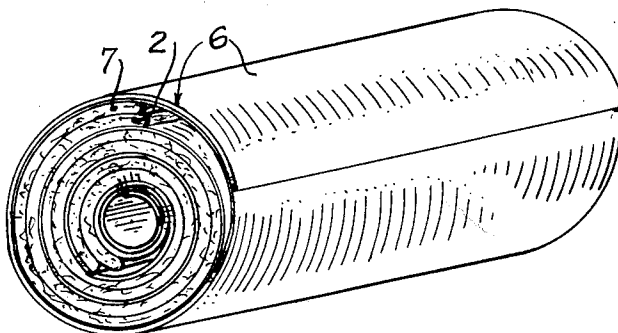


Fig. 2.



INVENTOR.

Leon Parker

BY

Philip Lubkow

ATTORNEY.

June 30, 1953

L. PARKER

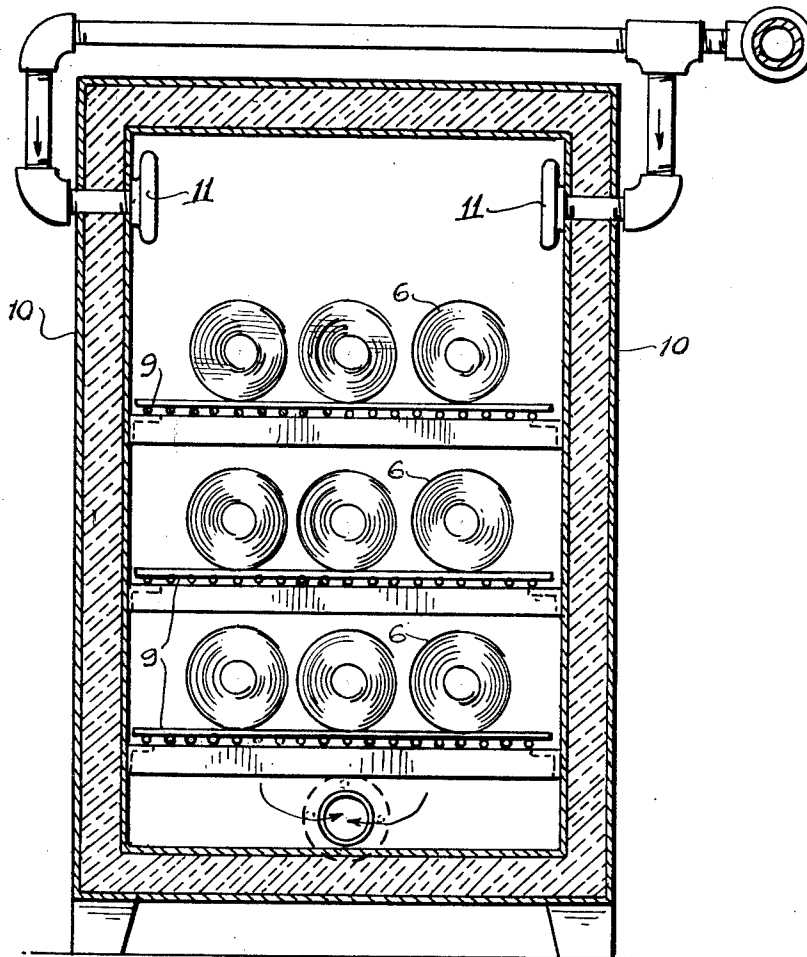
2,643,487

METHOD OF PRODUCING BATTS OF SILICA FIBERS

Filed March 23, 1951

2 Sheets-Sheet 2

Fig. 3.



INVENTOR.
Leon Parker
BY *Philip Sutko*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,643,487

METHOD OF PRODUCING BATTS OF
SILICA FIBERS

Leon Parker, Burbank, Calif., assignor to The
H. I. Thompson Company, Los Angeles, Calif.,
a corporation of California

Application March 23, 1951, Serial No. 217,153

5 Claims. (Cl. 49—77)

1

This invention relates to improvements in fabricating batts of silica fibers, such as are suitable for use in fabricating insulating blankets.

United States Letters Patent No. 2,491,761, issued to Leon Parker et al., discloses methods for production of batts of silica fibers in batt form. In such process batts of glass fibers, preferably resin bonded, are extracted with acid to remove non-siliceous glass forming metal oxides. The resultant fibers are, as has been found, silica in hydrated form. Such fibers are dehydrated by heating to an elevated temperature as described in said patent. The heating also burns off the resin and with the resin bond removed, the batt, while unwadded, because the resin has held the shape of the batt during leaching and firing, fluffs up as a result of the firing operation so that the bulk density of the batt is diminished.

In order to obtain a batt of higher density, i. e., more weight per cubic foot, and greater mechanical strength, the following procedure has been suggested: Place a layer of crinkled paper, such as a ripple kraft paper, over the batt and roll it up on a mandrel. The roll while still on the mandrel is fired by heating to a high temperature, about 1600° F. for 16 to 20 hours. The paper is burned off in this procedure. Experience has shown that if this mandrel is non-combustible, such as a metallic mandrel, the batt for about the first three rows next to the mandrel is brittle and broken into a fine dust. I have found, however, that if I use a combustible mandrel, i. e., one that would burn up as does the paper interliner, for example, if a suitable paper core be used, a satisfactory batt is obtained, provided the rigidity of the mandrel is also of critical character. Thus, as I have found by experience, if the combustible core were rigid, i. e., cannot be crushed by hand by a man of normal strength, or if it requires excessive power to do so, the batt will be brittle adjacent the mandrel as in the case of the uncombustible mandrel.

The use of combustible cores has the disadvantage that it introduces a considerable amount of fluxing ash and sometimes carbonized matter which contaminates the silica batt, particularly at its ends. A portion of the batt must thus be cut off and discarded.

I have now found that one may eliminate the use of cores by employing the plain uncrinkled kraft paper which in prior practice has proved unsatisfactory when employing a core mandrel of either combustible or uncombustible character.

2

I have found by experiment, employing plain kraft paper of 30, 40, 45, 50, and 60 pound weight, that the lighter paper, i. e., 30 pound plain kraft paper, is to be preferred and produces in the procedure described below a white, soft, but not too fluffy, batt, whereas the heavier paper gives a product that tends to be black and brittle.

This invention will be further described in connection with the drawings, in which

Fig. 1 shows a somewhat schematic form and in part section one means for winding the rolls;

Fig. 2 shows a schematic perspective view of a roll suitable for firing; and

Fig. 3 is a vertical section of a furnace for firing the rolls.

The mandrel 3 is rotated by suitable gearing 4 driven by a power source, not shown. A roll of plain crinkle free paper 6, mounted on a suitable rotatable mandrel 5, is unwound and passed via conveyor 1, and about two layers of paper are wound on the mandrel 3. One suitable hollow core which I have successfully used is about 3½" outside diameter and ¼" wall thickness and 44" long. Two layers 2 and 7 of batt were laid on top of each other on the continuous length of paper with the bottom layer extending a short distance ahead of the top layer. The top batt was guided over a freely rotating rod 8 which was fixed above the batts and back from where the two batts meet just before going on the core. This arrangement obviates the possibility of the top batt sticking to the bottom one as they are pulled along the conveyor and thus wrinkling or laying in folds during the wrapping operation. When the lengths of batt were completely wound on the core, additional layers of paper were wound upon the exterior of the roll to hold the batts in position. The batts wound upon the mandrel are removed from the machine. The roll of material on the core is then sent to the heat treaters. The core is left in so that in packing the rolls in boxes and in transporting the boxes, the rolls of material are not crushed by their own weight. The cores are removed just before the rolls are placed on the trays 9 of the furnace 10 for firing. The rolls thus have a hollow mandrel free cylindrical core, where the mandrel had been originally present, with an interior surface made up of the interior layers of paper.

I have found it desirable to bring the batts very rapidly to temperature. I have found that if the batts are brought slowly to temperature and heated for a prolonged time in an elevated temperature range of 1600° F. for 16 to 18 hours, a fluffy batt is obtained. I have found,

3

however, that if the batt is raised very rapidly to a high temperature and heated rapidly to the elevated temperature and held for a relatively short period of time at such temperature, the procedure results in a better and less fluffy product.

The furnace 10 is gas fired, having burners 11 on two opposite sides near the top. The rolls of material are placed in the furnace trays 9 constructed to provide adequate ventilation. I have found that if the furnace is brought up to heat slowly, the fired rolls of batt will be fluffy. Furthermore, fluffy material will be obtained if the furnace is not preheated at the firing temperature for a sufficiently long time prior to the loading with the batt in order to bring the furnace to a uniform temperature. I have found it preferable to heat the furnace empty at 1600° F. to 2000° F., for example, 1800° F., before a load of leached glass is put inside in order to bring the furnace up to a high temperature. Thus, for example, I heat the furnace to about 900° F. and higher, then it is opened to receive the rolled batts and the temperature is raised to 1750° to 1850° F., for example 1800° F. in about 15 minutes and held for about 9 hours.

I have found it preferable to set the furnace thermostatic control at 1775° F. and normal fluctuation is $\pm 25^\circ$ F. It is found that when temperature reaches 1875° F. or over, the rolls on the top rack closest to the burners tend to become brittle.

While the above temperatures and times are given as being best for the operating conditions found in present commercial practice, they are to be taken as illustrative only, since for furnaces of different design, the actual temperatures and times may be somewhat different. The principle to be observed is that the temperature of the furnace should be preferably at the ignition temperature of the paper and sufficiently high to cause a rapid rise of the batt to the temperature of the furnace and the temperature of the furnace should be raised rapidly to a high firing temperature which should be below the melting point of the fibers, and preferably as high as possible so that the time to which the fibers are exposed during heating is made small.

While I have described a particular embodiment of my invention for the purpose of illustration, it should be understood that various modifications and adaptations thereof may be made within the spirit of the invention as set forth in the appended claims.

I claim:

1. A method of dehydrating batts of leached and hydrated glass, siliceous fibers, which comprises inter-rolling a continuous web of batt and paper to form a roll wherein an inner hollow core

4

is formed said roll having sufficient rigidity to maintain its shape during heating, rapidly heating said roll to a dehydrating temperature above the ignition point of the paper, burning the paper layers, and dehydrating the batt.

2. A method of dehydrating batts of leached and hydrated glass, siliceous fibers, which comprises inter-rolling a continuous web of batt and plain kraft paper to form a roll wherein an inner hollow core is formed said roll having interior layers of paper, rapidly heating said roll to a dehydrating temperature sufficiently high to ignite the paper, burning of the paper layers, and dehydrating the batt.

3. A method of dehydrating batts of leached and hydrated glass, siliceous fibers, which comprises inter-rolling a continuous web of batt and paper to form a roll wherein an inner hollow core is formed said roll having interior layers of paper, introducing said roll into a preheated furnace at a temperature above about 900° F. and rapidly heating said furnace and roll to a temperature of about 1800° F., and maintaining said heat for about 8 to 10 hours.

4. A method of dehydrating batts of leached and hydrated glass, siliceous fibers, which comprises inter-rolling a continuous web of batt and paper to form a roll wherein an inner hollow core is formed, said roll having sufficient rigidity to maintain its shape during heating, introducing said rolled batts into a furnace maintained at a temperature of 900 to 2000° F., maintaining the said batts in said furnace for a sufficient time to burn said paper and dehydrate said batts, burning off the paper layers, and dehydrating the batt.

5. A method of dehydrating batts of leached and hydrated glass, siliceous fibers, which comprises inter-rolling a continuous web of batt and plain kraft paper to form a roll wherein an inner hollow core is formed, said roll having interior layers of paper, introducing said rolled batts into a furnace maintained at a temperature of 900 to 2000° F., maintaining the said batts in said furnace for a sufficient time to burn said paper and dehydrate said batts, burning off the paper layers, and dehydrating the batt.

LEON PARKER.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,171,006	Morgan	Aug. 29, 1939
2,318,243	McClure	May 4, 1943
2,428,653	Collins	Oct. 7, 1947
2,518,744	Barnard	Aug. 15, 1950
2,526,870	Jelinek	Oct. 24, 1950
2,565,941	Barnard	Aug. 28, 1951