Jan. 19, 1937. C. W. POE 2,067,982

INSULATING MATERIAL AND METHOD OF PRODUCING SAME

Filed April 4, 1935 2 Sheets-Sheet 1

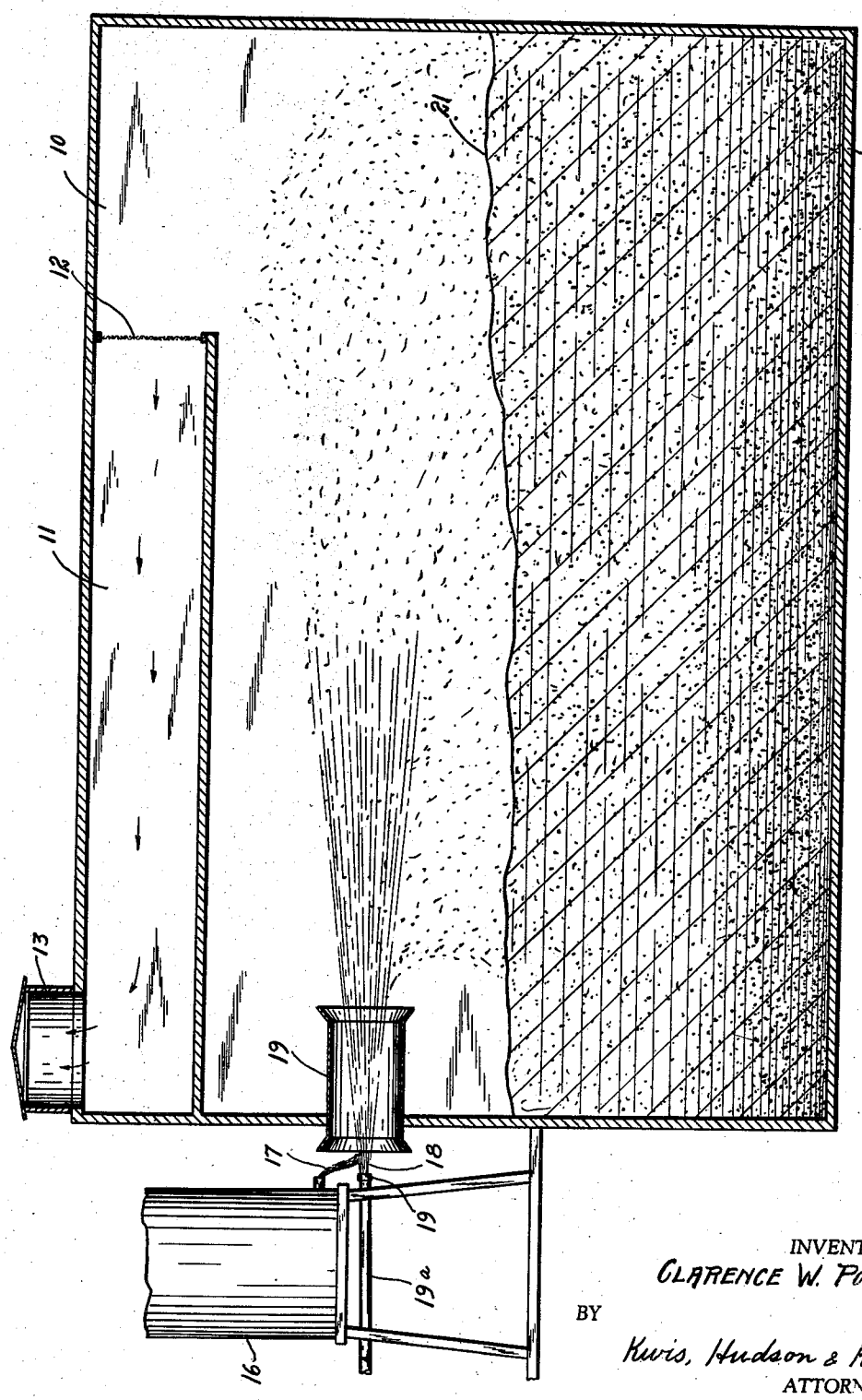

Fig. 1.

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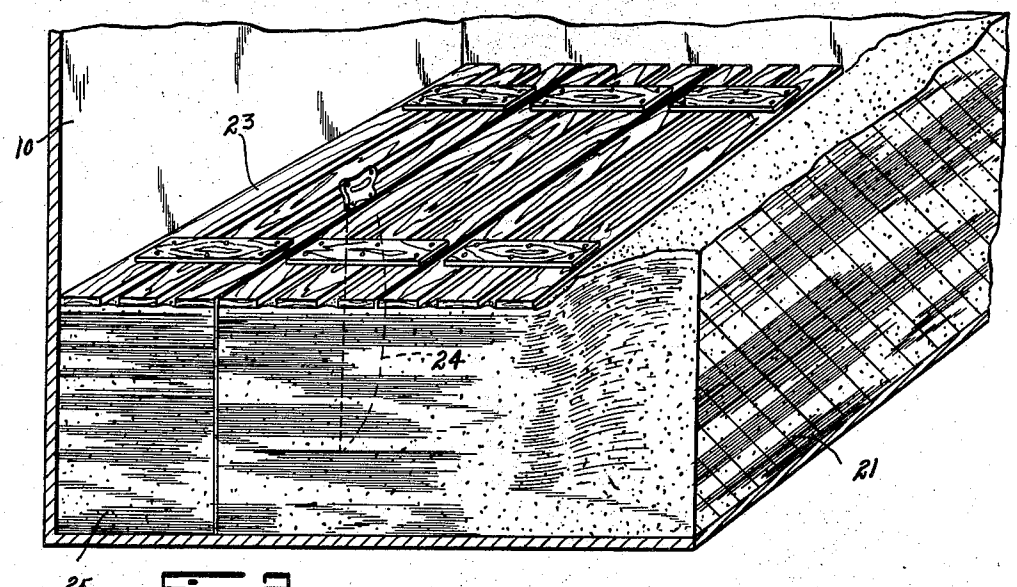

Fig. 2.

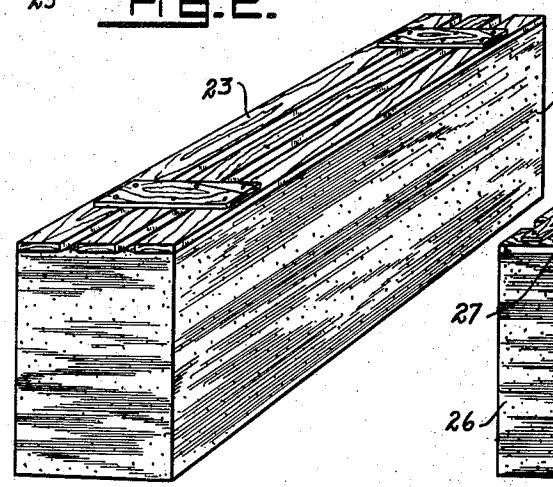

Fig. 3.

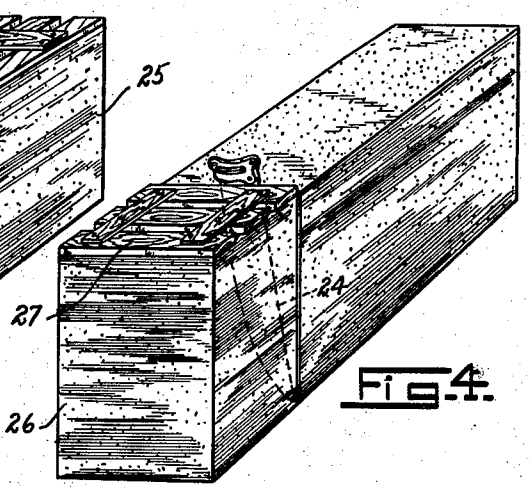

Fig. 4.

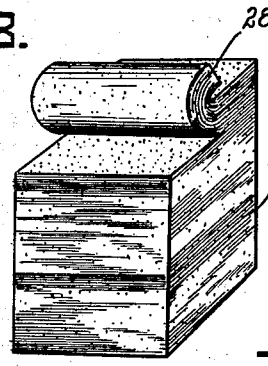

Fig. 5.

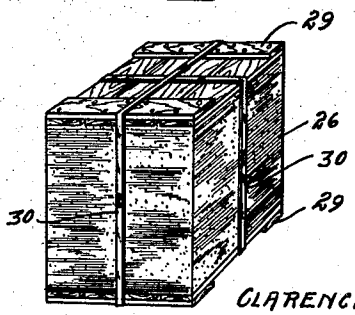

Fig. 6.

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INSULATING MATERIAL AND METHOD OF PRODUCING SAME

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Application April 4, 1935, Serial No. 14,665

5 Claims. (Cl. 154—28)

This invention relates to the manufacture of insulating material, and more particularly to a novel method of producing insulating bats or the like from mineral wool.

An object of the present invention is to provide a novel method for the production and handling of mineral wool insulation whereby the wool retains, substantially, its natural fiber arrangement and insulating qualities and is made available in bats or the like of any desired size and thickness.

Another object of the present invention is to provide a novel method of handling mineral wool insulation, involving the collecting and compacting of the wool to form a more or less stratified block which can be handled or shipped without disturbing the fiber arrangement and which has dimensions corresponding with the length and width of a desired insulating bat, and then splitting the stratified block into layers of desired thickness.

Still another object of the present invention is to provide a novel and economical method for producing mineral wool insulating bats, or the like, in accordance with which the wool is projected into a chamber and allowed to collect therein as a more or less stratified body, and such body is thereafter partially compacted and split on planes parallel to the strata.

Another object of this invention is to provide a novel method for producing mineral wool insulating bats, or the like, which comprises projecting the wool into a chamber and allowing the same to collect therein as a more or less stratified body, then partially compacting the body and cutting the same into sections transversely of the strata while thus compacted, and then removing layers or bats of desired thickness from the sections.

Other objects and advantages of the invention will be apparent from the following description when taken in conjunction with the accompanying sheets of drawings, wherein

Fig. 1 is an elevational view, with parts in section, showing apparatus which may be used in carrying out my novel method.

Fig. 2 is a perspective view, partly in section, illustrating one step of my novel method.

Fig. 3 is a perspective view showing an elongated section which has been cut from the partially compacted body of mineral wool.

Fig. 4 is a perspective view showing the elongated section of Fig. 3 being cut into smaller sections.

Fig. 5 is a perspective view showing a bat being split from the top of one of the sections, and

Fig. 6 is a perspective view showing one of the stratified sections prepared for handling or shipping.

My novel method, which is to be described more in detail hereinafter, provides for the economical production of insulating bats, or the like, of mineral wool with a minimum crushing and disturbance of the wool fibers. Such bats of mineral wool are commonly used for the insulation of homes, ovens and various other structures, and for maximum insulating efficiency the wool fibers should remain in an unbroken, relatively loose and fluffy condition. Bats of this character are produced by my novel method, the first step of which consists in projecting mineral wool into a chamber or compartment and allowing it to settle therein in a natural and more or less stratified body. The collected wool is then partially compacted into a stratified block or section, of a desired size, from which successive layers of the wool, of the desired bat thickness, are then peeled or split on planes extending parallel with the strata.

In carrying out my novel method, the mineral wool may be projected into the collecting chamber directly from the wool producing apparatus and at the rate that the wool is being produced. In Fig. 1 of the drawings I have shown one form of apparatus which may be used for producing the wool and collecting the same in a stratified body. It will be understood, of course, that various other kinds of suitable apparatus may be used in carrying out this method step.

The apparatus illustrated in this instance comprises a collecting chamber or compartment 10, which may be substantially closed except for an outlet for air and vapor and an inlet for the mineral wool. The air and vapor outlet may be a circuitous or baffled passage 11, leading from the collecting chamber to atmosphere. This passage may have one or more screens 12 therein to prevent the mineral wool from being carried out of the collecting chamber by the air stream, and at its outer end may have a cupola 13 through which the passage discharges to atmosphere.

The mineral wool which is supplied to the chamber 10 may be produced by a well known blowing operation performed by apparatus 15 located adjacent the chamber. Various kinds of available apparatus may be used for producing the mineral wool, one arrangement of which is illustrated in this instance as comprising a blast furnace or cupola 16 for delivering a stream 17

of molten material to a jet 18 of steam or other suitable fluid being discharged from the nozzle 19. The steam or other pressure fluid is supplied to the nozzle through the pipe 19a. The jet 18 breaks up or shreds the stream 17 into minute glass-like strands or threads and thus converts the molten material into what is known as wool. The molten material from which the wool is produced is a lava-like substance formed by melting slag, rock, or the like.

The steam jet 18 is arranged to project the mineral wool into the chamber 10, preferably through a relatively short tubular member 19. The wool projected into the chamber 10 is in a light, fluffy condition, and, in accordance with my invention, is allowed to settle to the floor or bottom 20 of the chamber and collect in a natural and more or less stratified body. When the mineral wool is allowed to settle and collect on the floor of the chamber in this manner, the fibers remain in an unbroken and uncrushed condition and build up upon each other in substantially horizontally extending strata to constitute the stratified body of wool 21 shown in the drawings.

The collecting chamber 10 may be of any desired size or shape, and may be a chamber having length and width corresponding with similar dimensions of a stratified block to be formed, or may be a chamber of a size to produce a very large stratified block from which a number of smaller stratified blocks or sections may be cut.

After the operation of the producing apparatus 15 has continued for a long enough time to cause a substantial body of the wool to be built up in the collecting chamber 10, the producing apparatus is shut down and pressure is then applied to squeeze the wool into a partially compacted and more or less stratified block. The pressure may be applied by any desired means and may be applied to act in any desired direction, I prefer, however, to apply the pressure either from the top or bottom of the collected mass, that is to say in a direction substantially normal to the planes of the strata. I prefer to apply only sufficient pressure to enable the body of wool to be formed into sections which can be conveniently handled in the manner to be explained hereinafter. It is desirable that excessive pressure be not applied to the collected body of wool, because it will crush and break the fibers of the mineral wool and will thereby destroy their ability to resume a loose and fluffy condition and thus greatly reduce their efficiency as an insulating medium.

The partial compacting of the body of mineral wool may be carried out in various ways, for example, gratings 23 formed of boards or slats, as shown in Fig. 2, may be introduced into the collecting chamber 10 and laid upon the upper surface of the body of wool. The load needed to compact the body of wool the desired extent may be furnished by one or more workmen standing on the gratings. If desired, additional load may be placed on the gratings in the form of suitable weights, should this be desirable or necessary. The gratings 23 are preferably formed in elongated sections corresponding in dimensions with the lateral dimensions of sections which are to be cut from the collected and compacted body of mineral wool.

After the gratings 23 have been applied to the top of the body of wool, and while the wool is in the compressed or partially compacted condition, the body is cut into sections. The cutting operation may be performed while the wool is still in the collecting chamber, but if desired, provision may be made for removing the compacted body from the chamber prior to the cutting so that resumption of the operation of the producing apparatus need not be delayed.

Sections of any desired size may be cut from the compacted body of wool, and if desired, the gratings 23 may be constructed of the size of the sections to be cut. The compacted body may be divided into such sections by cutting along the edges of the gratings 23 and transversely of the strata of wool fibers. Any suitable apparatus may be used for cutting the compacted body into the desired sections, for example, a saw-like knife 24 may be used for this purpose. In Fig. 2 of the drawings I show, by way of example, an elongated section 25 being cut from the compacted body 21 by movement of the knife 24 along the edge of one of the gratings 23. In Fig. 3 of the drawings I show the section 25 as it would appear after having been separated from the original body 21.

If the insulating is to be used as bats of shorter dimension than the elongated section 25, this section may be cut transversely into a number of smaller sections or blocks 26, as shown in Fig. 4 of the drawings. In cutting these smaller sections, the grating 23 is replaced by a smaller grating 27 which is used as a compacting means and template while the smaller sections are being cut.

After the sections or blocks of the partially compacted stratified wool have been formed, as explained above, the compacting pressure and the gratings are removed and the desired insulating bats are peeled or split from the blocks. These bats are preferably peeled or split in succession from the top of the blocks, although the blocks may be divided into bats in various other ways. In dividing the blocks into bats, the wool is split on spaced planes extending parallel with the natural strata of the body of wool, as shown in Fig. 5, and in this way the separating of the blocks into the bats 28 can be carried out with minimum breakage or disturbance of the wool fibers. The bats which are successively peeled or separated from the tops of the blocks may then be placed in suitable containers for transportation to the point of use. It should be understood that the blocks of compacted wool, such as the blocks 25 and 26, are formed so as to have lateral dimensions which correspond substantially with the length and width of the bats being produced. For example the length and width of the section 26 may correspond with the length and width of an insulating bat which is needed at the top of the ovens of certain stoves being manufactured. By simply peeling successive layers from the block 26, the bats of desired thickness can be had and immediately applied to the oven structures.

It is not necessary that the blocks 26 be immediately split into bats and, in most instances, these blocks are transported to the point of use, which may be a stove factory or other place, and there split into bats of the desired thickness. The blocks are especially adapted to the carrying out of my method because they are compact and can be readily handled and transported without destroying the original fiber arrangement. The blocks may be retained in shape and in the compacted condition by any suitable means such as the end boards 29 applied to the top and bottom, as shown in Fig.

6, and the metal bands 30 extending around the boards and block.

From the foregoing description and the accompanying drawings it will now be readily seen that I have provided a novel method for producing insulating bats of mineral wool with minimum breakage and crushing of the wool fibers. When insulating bats are formed from mineral wool in accordance with my method, the wool is partially compressed to enable the same to be formed into blocks or sections of the desired dimension, but since the wool is in a naturally stratified condition, such compressing produces very little breakage or crushing of the wool fibers. It will therefore be seen, that when the pressure is released and the sections are split into bats of desired thickness, the mineral wool will still have its natural and original stratified fiber arrangement, and will be in a relatively loose and fluffy condition which is very desirable for maximum insulating value.

In the specification and claims I have referred to the insulating material as "mineral wool," and by this expression I mean any of the vitreous-like insulating wools regardless of whether they are formed from rock, slag, limestone, synthetic minerals, glass, silica or any other material. It should also be understood that the term "bat", as used in the specification and claims, is intended to mean any body, blanket, layer or the like, of insulation regardless of its size, shape or specific use.

While I have described the method of my invention in a somewhat detailed manner, it should be understood that I do not wish to be limited to the exact steps of procedure herein disclosed, but regard my invention as including such changes as do not constitute a departure from the spirit of the invention and the scope of the appended claims.

Having thus described my invention I claim:

1. The method of producing insulating bats which comprises projecting mineral wool into a chamber and allowing the wool to settle therein with its fibers extending in substantially horizontal strata, applying pressure to the top of the stratified wool and relatively compacting the same without otherwise disturbing the wool fibers, and thereafter splitting the stratified compacted wool substantially horizontally into bats.

2. The method of producing insulating bats or the like which comprises projecting mineral wool into a chamber and allowing the wool to collect therein as a stratified body, applying pressure to the body substantially normally to the plane of the strata to partially compact the wool, cutting the body into sections while thus compacted, and thereafter splitting the sections on spaced planes parallel to the strata.

3. The method of producing insulating bats or the like which comprises projecting mineral wool into a chamber and allowing the wool to collect therein as a stratified body, applying pressure to the body substantially normally to the plane of the strata to partially compact the wool, cutting the body transversely of the strata while thus compacted and thereby dividing the body into sections having lateral dimensions corresponding substantially with the bat size desired, and then splitting the sections on spaced planes parallel to the strata.

4. The herein described method of producing insulating wool bats or the like which comprises projecting insulating wool into a chamber and collecting the wool therein in a naturally stratified condition, compacting the collected wool by force applied thereto in a direction transversely of the fiber strata, cutting the compacted stratified body of wool into blocks of length and width corresponding substantially with the length and width of the insulating bats to be produced, transporting the blocks to a point of use and meanwhile maintaining the stratified wool in the compacted condition, releasing the pressure on the compacted wool, and then separating the blocks into insulating bats or layers by successively splitting the same on spaced planes extending substantially parallel with the fiber strata.

5. As an article of manufacture a block of horizontally stratified mineral wool having lateral dimensions corresponding substantially with a desired bat size, and removable binding means normally holding the stratified wool block in a compacted condition for handling and shipment, said block having a horizontal cleavage between strata whereby it is adapted to have bats of desired thickness peeled therefrom in succession after removal of said holding means.

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