UNITED STATES PATENT OFFICE.

GEORGE KELLY, OF HINSDALE, ILLINOIS.

COMPOSITE INSULATING MATERIAL.

No. 811,227. Specification of Letters Patent. Patented Jan. 30, 1906.

Application filed August 16, 1905. Serial No. 274,473.

To all whom it may concern:

Be it known that I, GEORGE KELLY, a citizen of the United States, residing at Hinsdale, in the county of Dupage and State of Illinois, have invented a new and useful Composite Insulating Material, of which the following is a specification.

It is a well-known fact that while mineral wool is an excellent insulating material it is practically impossible to use it alone, as it will not form a self-sustaining structure, and, furthermore, in time will disintegrate and pack down, so that if placed between walls it will leave an open space above it.

In a patent, No. 688,420, granted to me on December 10, 1901, there is disclosed a self-sustaining board, tile, or slab and a method of producing the same, said board, tile, or slab being composed of mineral wool and a binder of paper-pulp intermixed therewith. The price of paper-pulp has increased enormously, adding very materially to the cost of the product. Furthermore, in the method described in the patent it is necessary to pulp the paper and wool, a comparatively expensive process, resulting in a board, tile, or slab of good insulating properties, but still rather compact and not of as high grade as desirable.

In another patent, No. 683,208, granted to me on September 24, 1901, there is disclosed a composite insulating material composed of alternate layers of mineral wool and flax fiber in a loose dry condition, covered with flexible material, together with stitches that secure the layers and cover in intimate relation. In preparing the flax fiber for this material the straw or tow is cooked in a digester by a suitable chemical process, so that the fiber is degummed. Said fiber is then dried and is afterward passed through a batten-lap machine. The fiber enters the machine in a loose state at one end and goes out at the other formed in a bat or felt. In passing through the machine there is about one-third of the valuable fiber wasted, which waste or by-product consists of the short portions that fall through the screens of the above-named machine while the felt is being formed. This by-product, notwithstanding the fact that it has been degummed, has heretofore been a complete loss. The peculiarity about it is that it has tentacles or is barb-like in form.

The object of the present invention is to produce a composite insulating material which is better and lighter and more porous than the combination of paper and mineral wool and wherein the above-described waste is employed.

In carrying out the invention equal parts, by weight, of the short degummed flax fiber and of mineral wool are preferably taken, though the proportions may be varied, as found desirable. These are placed in any ordinary mixer—such, for instance, as a paper-beating engine—together with a quantity of water sufficient to carry the mixture around the wheel or paddles. The machine is operated until the ingredients are thoroughly mixed, care being taken to prevent the pulping of the substances, an important feature, by raising the knives up from the bed.

The parts being well intermingled, the mixture is then dumped into a tank. From this tank it is put into draining-screens of the proper depth and length, and it is then rolled slightly, forming a board, tile, slab, or section of the proper depth, length, and width. These articles are then removed to the dry-house, and in the drying operation the wool is caught in and by the claw-like shapes or barbs of the fiber, so that a composite material is formed of comparatively great strength, which material is more spongy than a pulped composition, is consequently lighter in weight, and of necessity has a large number of air cells or spaces containing dead air in a honeycomb-like formation. Finally, the structure is very much less expensive than that in which the paper-pulp is employed, as the short degummed flax fiber is employed, which has heretofore been a complete waste, and the expensive process of forming the wool and paper into a pulp is obviated. The pulping of flax fiber would destroy its insulating qualities and, besides, is not necessary, for owing to the claw-like shape of the short fiber the latter takes hold of the wool and forms a self-sustaining board, slab, tile, or brick capable of being handled.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The method of producing a self-sustaining insulating board, tile or slab for cold-storage or other insulating purposes, which consists in forming a body of thoroughly-commingled flax fiber, mineral wool and liquid, subsequently forming said body into a board, tile, slab, or other form, and drying the same.

2. The method of producing an insulating board, tile or slab for cold-storage or other insulating purposes, which consists in stirring

a wet body of flax fiber and mineral wool until the same are thoroughly commingled, stopping the stirring action prior to the pulping of the same, forming the mixture into a board, tile, slab, or other form, and drying the same.

3. The method of producing an insulating board, tile, or slab for cold-storage or other insulating purposes, which consists in commingling in water substantially equal quantities of mineral wool and degummed short flax fiber, stopping the commingling action prior to the pulping of the fiber, then forming the mixture into a board, tile, slab, or other form, and drying the same.

4. A self-sustaining board, tile, slab, or other form for cold-storage or other insulation, composed of thoroughly-commingled mineral wool and flax fiber.

5. A self-sustaining board, tile, slab, or other form for cold-storage or other insulation composed of thoroughly-commingled mineral wool and degummed flax fiber.

6. A self-sustaining board, tile, slab, or other form for cold-storage or other insulation, composed of thoroughly-commingled mineral wool and flax fiber extending throughout the body of the said board, tile, slab, or other form, said fiber and wool being thoroughly commingled with water and dried.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE KELLY.

Witnesses:

OTTO C. KRAEMER,

JOSEPH H. KRAEMER.