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METHOD OF TREATING AMPHIBOLIC MATERIAL FOR TRANSPORTATION

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For more than fifty years, what are known to the trade as "asbestos products" have been formed by mining amphibolic rocks, for instance what is known as chrysotile, or serpentine, in which the amphibole occurs in narrow reticulating veins, in which the fibers stand at right angles to the walls and are usually less than three inches in length. Typical analyses of said two rocks are as follows:

Canadian chrysotile		Serpentine	
	Per cent		*Per cent*
Silicon dioxid	39.60	Silicon dioxid	39.20
Aluminum oxid	None	Aluminum oxid	.99
Iron oxid	2.58	Iron oxid	2.97
Iron monoxid	1.62	Iron monoxid	4.02
Magnesium monoxid	41.99	Magnesium monoxid	44.02
H_2O	14.44	H_2O	8.85

The long silky fibers known as "crude" are separated by hand from the rock and have sufficient tensile strength to be used for textiles; but to recover the asbestos from the smaller veins it is necessary to crush the rock and separate the fibers mechanically; producing a wide variety of grades from material which may be used in textiles to the shortest mill fiber used in making paper, and asbestic sand, for wall plaster; the long fibered crude aforesaid being only about one per cent., of the total product. From the beginning of said industry down to the present time, it has been the practice to ship such amphibolic material from the mines in the loose state in which it is separated from the rock and in burlap bags. For instance, the shortest mill fibers known to the trade as "shorts" are thus shipped in bags holding one hundred pounds and occupying approximately three cubic feet of space in a freight car. The effect of transportation of such material is to sift the short flocculent fibers and asbestic sand through the meshes of the bags with the effect of damaging with the dust thus produced any other freight included in the same car, and such known capacity for production of damaging dust is a very important limiting factor in the marketing of such products, for the reason that many dealers having a demand for such products refuse to carry them in stock because of the damaging effect thereof upon stocks of other material which may be stored in the same building.

Moreover, such ordinary methods and means of transportation of amphibolic products impose a considerable loss of the material in transit, which is highly important in view of the fact that the long fibered crude may be worth five hundred dollars or more a ton.

Therefore, the purpose and effect of my invention is to minimize the space occupied by such products in shipment; to prevent disintegration and shifting of the products from the containers thereof and to eliminate the damaging dust-forming capacity of such products as they are ordinarily marketed; to thus not only prevent loss of the material in transit, but reduce the cost of transportation and increase the number of distributors willing to market such products.

Such effects are attained, in accordance with my invention, by first very materially reducing the water component of said materials to from 1% to 2.50% as compared with the natural 8.85% and 14.44%. To then compress the flocculent product of the mining and separating operations aforesaid to a compact solid form. For instance, commercial shorts of which one hundred pounds ordinarily occupy three cubic feet of space may be compressed to a volume of but one cubic foot and packed in an imperforate container formed of paste board having the joints thereof covered with adhesive paper.

I find it convenient to effect such treatment by depositing the flocculent material in a container which confines it while compacting it under a pressure of one hundred and twenty-four tons to the square foot because a hydraulic press of that capacity was available. However, said material may be suitably compressed under a less pressure per unit of area. The amphibolic material thus treated for transportation is thus freed from all of the objections aforesaid characteristic of such material as now being marketed in the ordinary manner aforesaid.

Although the material thus treated is in a solid form and so remains during transportation, it remains so far frangible as to

be susceptible of being immediately reduced to its original flocculent form by crumbling it by hand or with any suitable tool so that it is readily susceptible of disintegration to the comminuted form in which it is desired for use. That quality of the treated product is dependent upon the elimination of the natural water content of the material as mined, for, if it is compressed and compacted with the natural moisture in it, it is thereby rendered incapable of such ready disintegration, but when the compressed product is broken it is found to be characterized by a lumpy fracture owing to the presence of such excess moisture.

Moreover, it may be observed that although it is necessary to subject the raw material to considerable pressure to compact it, the compressed product is renitent to only a negligible degree, is not expanded by absorption of moisture from the atmosphere during transportation, but is readily friable when released from the container in which it is transported.

The solid products of the process aforesaid are preferably made rectangular to permit the maximum carloading thereof which is more than three times that of the bags of loose raw material aforesaid, and this invention is advantageous in that it is not only thus possible to transport three times the weight of amphibolic material in a given car space but a larger percentage of that weight is amphibolic material, because of the preliminary elimination of the water content of the natural mineral.

However, it is to be understood that the naturally loosely flocculent amphibolic material aforesaid may be desiccated and compacted for transportation in any convenient way by any suitable means, and to any desired form.

Therefore, I do not desire to limit myself to the precise details of procedure or structure herein set forth, as it is obvious that various modifications may be made therein without departing from the esential features of my invention, as defined in the appended claims.

I claim:

1. The method of treating naturally loosely flocculent amphibolic material for transportation; which consists in reducing the natural moisture content of such material, as mined, and considerably reducing the bulk of such material, while retaining its initial commercial quality, by confining and compressing the desiccated material to solid but frangible form; from which it may be subsequently released and restored to its initial composition and flocculent form.

2. The method of treating asbestos shorts for transportation, which consists in reducing the natural moisture content of such material, as mined, to approximately two per cent., of H_2O, and considerably reducing the bulk of such material, while retaining its initial commercial quality, by confining it and compressing it to solid but frangible form; from which it may be subsequently released and restored to its initial composition and flocculent form.

3. The method of treating naturally loosely flocculent amphibolic material for transportation; which consists in reducing the natural moisture content of such material, as mined, to from 1.75 to 2.10 per cent., of H_2O; confining and compressing it to solid but frangible form and thereby materially reducing its volume, while retaining its initial commercial quality; and confining the compressed compacted product in an imperforate container; whereby the capacity of said material for desired comminution to its initial volume and flocculent form is retained, but transportation thereof may be effected, in minimum space, without loss thereof by dissipation.

4. A product of the process described; consisting of a solidly compressed but frangible mass of initially flocculent amphibolic material, having a materially reduced moisture content, but retaining its initial qualities, and capable of being released and restored to its initial volume and flocculent form.

5. A product of the process described; consisting of a solidly compressed but frangible mass of initially flocculent amphibolic material, having a materially reduced moisture content but retaining its initial qualities, and capable of being released and restored to its initial volume and flocculent form; in combination with an imperforate paper covering thereon; said material being capable of being restored to its original volume and flocculent form when released from said covering.

6. The method of treating naturally loosely flocculent amphibolic material to substantially reduce its volume, for transportation; which consists in reducing the natural moisture content of such material, as mined, and confining and compressing the desiccated material to solid rectangular but friable form, while retaining its initial commercial quality and capacity for resumption of its initial composition and flocculent form.

7. A product of the process described, consisting of a rectangular solidly compressed but friable mass of initially flocculent amphibolic material, having a materially reduced moisture content, but retaining its initial qualities and capable of resuming its initial flocculent form.

In testimony whereof, I have hereunto signed my name at Chicago, Illinois, this third day of September, 1930.

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Method of treating amphibolic material for Transportation (US Patent 1,894,250, 1933)
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ACL Doc 23173 · Page 2 of 2
asbestosclaims.law/library/23173/2