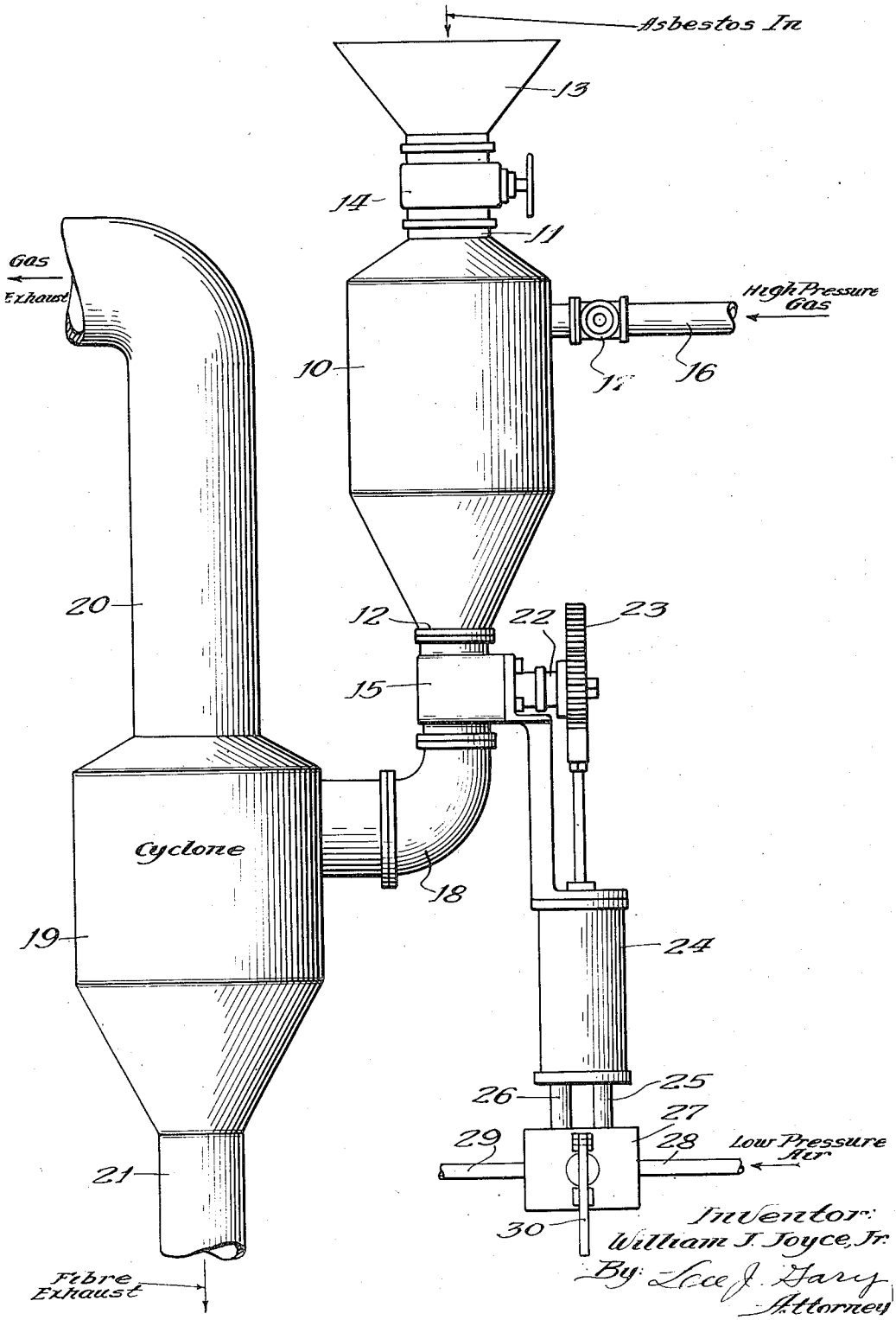
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METHOD OF FIBERIZING ASBESTOS

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METHOD OF FIBERIZING ASBESTOS

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10 Claims. (Cl. 19—1)

This invention relates to a novel method of opening rock, crushed and the like asbestos fibre aggregates to produce therefrom individualized asbestos fibres of substantially natural fibre length.

Asbestos is the generic or commercial term applied to varieties of several minerals of fibrous, crystalline structure, the best known varieties being chrysotile, amosite and crocidolite, the chrysotile form being of most predominant occurrence and production, and also of most usefulness due to its content of fine, long fibres of high tensile strength. The value of asbestos lies primarily in the length of its fibres, the ability to card, spin and weave it, and the ability to produce therefrom various materials such as yarn, cloth, felt, tape, paper, millboard and many specific products well known in the art. Thus, what is commercially known as the "grade" of the fibre refers not to the source or variety but to the fibre length, No. 1 grade having a length of about one inch or more.

Heretofore asbestos has been subjected to crushing, beating or otherwise mechanically manipulated to "open" and separate the fibres with the end in view of making them fine and fit for carding, spinning and weaving, or good dry and wet felting. However, such mechanical processes inherently and in varying degree cause reduction in natural fibre length with the resultant production of commercially excessive fines and dust.

It is therefore an object of the present invention to fiberize or open asbestos in a simple but novel and highly effective manner which is conducive to the production of a maximum amount of fibers of high grade, that is of good length substantially equal to the natural length of the fibers, by what is essentially a physical method, as distinguished from chemical or mechanical methods.

In general my method comprises the explosive fiberization of asbestos in either rock or partially crushed form by confining it in a pressure chamber or vessel or "gun" together with a gaseous medium, which is inert with respect to asbestos, under pressure, and subsequently suddenly releasing the pressure whereby the asbestos is ejected and the fiber bundles subdivided along their natural lines of cleavage without tearing or changing their length substantially.

Other objects and advantages will be apparent from a consideration of the following specification and accompanying drawing which diagrammatically illustrates an arrangement of apparatus for carrying out my invention.

Referring to the drawing, the reference numeral 10 indicates a pressure chamber or "gun" the smallest internal diameter of which, including that of its inlet port 11 and outlet port 12, is sufficiently great to handle the introduced asbestos in its natural fiber length. The asbestos to be fiberized is introduced from a suitable hopper 13 through a valve 14, and is ejected through quick-opening valve 15, the valve apertures being likewise of sufficient dimension to permit "straight-through" introduction, and particularly ejection of the asbestos in its natural fiber length without causing bending or pressure which will shorten the length of the fibres or break the material as it discharges.

After the asbestos to be fiberized is introduced to pressure vessel 10, and with valves 14 and 15 closed, gas under pressure is introduced through line 16 and valve 17. As gaseous agents I may employ air, carbon dioxide, nitrogen, argon, ammonia, sulphur dioxide, steam and the like compressible fluids, or mixtures thereof which are inert with respect to the asbestos, under a high superatmospheric pressure such as from about 200 to about 1200 pounds per square inch, depending upon the nature of the asbestos, its condition, that is rock form, crushed, coarse, etc., and the desired degree of fiberization. I have found, for example, that a pressure of from about 400 to about 800 pounds per square inch is a suitable range for good fiberization of chrysotile asbestos in rock form to produce a finely divided fibrous mass of predominantly No. 1 grade fibers. After the pressure within the vessel 10 has reached the desired degree, valve 17 is closed and thereafter after a relatively short period of confinement, such as from about 5 to 30 seconds, valve 15 is suddenly fully opened by suitable quick acting means, and the material explosively discharged through exhaust line 18 to cyclone separator 19 wherefrom the expanded gas is exhausted upwardly through line 20 and the fiberized asbestos downwardly through exhaust line 21.

For the purpose of quickly or suddenly opening valve 15, I may, as illustrated couple the valve stem 22 thereof through a gear segment and rack 23 to an air cylinder 24, the cylinder being connected through the inlet line 25 and exhaust line 26 to the quick acting air valve 27, air under low pressure being admitted to the valve 27 through line 28 and exhausted through line 29, the valve actuation being controlled through the hand lever 30.

As indicated, my process requires only the application under pressure of a gas inert with re-

spect to asbestos, the term gas being understood to include a vaporous material such as steam, and the quick release of the pressure and discharge of the material. The process may be carried out with or without the presence of moisture and/or heat. In the employment of steam the vessel 10 may be suitably insulated or even heated to avoid loss of pressure or undue condensation. The presence of moisture or water resulting from the use of steam, or otherwise, causes the material to be ejected in a more or less tangled wetted mass of fibers. However, as indicated, the presence of moisture or heat, or pre-softening or heating of the asbestos, is not necessary to the successful operation of my process and I preferably operate with dry asbestos and a dry gas, under normal room temperature conditions, to obtain a finely fiberized product, the fibers being separated along their natural lines of cleavage and of substantially natural fiber length.

I claim as my invention:

1. The method of fiberizing unfiberized or partially fiberized crystalline masses of asbestos to produce asbestos fibers of a desired substantially uniform fineness and without substantial change in the original natural length of the fibers, which comprises: confining the asbestos aggregates in a closed zone together with a gaseous medium chemically inert with respect to asbestos under a superatmospheric pressure sufficient to effect fiberization but insufficient to cause detrimental reduction in fiber length, releasing the pressure suddenly to expel the asbestos from the closed zone into a zone of lower pressure to subdivide said aggregates into fibers of the desired substantially uniform fineness, and recovering the resulting fiberized asbestos.

2. The method of fiberizing unfiberized or partially fiberized crystalline masses of asbestos to produce asbestos fibers of a desired substantially uniform fineness and without substantial change in the original natural length of the fibers, which comprises: confining the asbestos aggregates at substantially normal temperature in a closed zone together with a gaseous medium chemically inert with respect to asbestos under a superatmospheric pressure sufficient to effect fiberization but insufficient to cause detrimental reduction in fiber length, releasing the pressure suddenly to expel the asbestos from the closed zone into a zone of lower pressure to subdivide said aggregates into fibers of the desired substantially uniform fineness, and recovering the resulting fiberized asbestos.

3. The method of fiberizing unfiberized or partially fiberized crystalline masses of asbestos to produce asbestos fibers of a desired substantially uniform fineness and without substantial change in the original natural length of the fibers, which comprises: confining the asbestos aggregates in a closed zone together with a substantially dry gaseous medium chemically inert with respect to asbestos under a superatmospheric pressure sufficient to effect fiberization but insufficient to cause detrimental reduction in fiber length, releasing the pressure suddenly to expel the asbestos from the closed zone into a zone of lower pressure to subdivide said aggregates into fibers of the desired substantially uniform fineness, and recovering the resulting fiberized asbestos.

4. The method of fiberizing unfiberized or partially fiberized crystalline masses of asbestos to produce asbestos fibers of a desired substantially uniform fiberization and without substantial change in the original natural length of the fibers, which comprises: confining the asbestos aggregates in a closed zone together with a gaseous medium chemically inert with respect to asbestos under a superatmospheric pressure sufficient to effect fiberization but insufficient to cause detrimental reduction in fiber length, releasing the pressure suddenly to expel the asbestos from the closed zone into a zone of lower pressure to subdivide said aggregates into fibers of the desired fineness and of substantially uniform fiberization, and recovering the resulting fiberized asbestos.

5. The method of fiberizing unfiberized or partially fiberized crystalline masses of asbestos to produce asbestos fibers of a desired substantially uniform fineness and without substantial change in the original natural length of the fibers, which comprises: confining the asbestos aggregates at substantially normal temperature in a closed zone together with a substantially dry gaseous medium chemically inert with respect to asbestos under a superatmospheric pressure sufficient to effect fiberization but insufficient to cause detrimental reduction in fiber length, releasing the pressure suddenly to expel the asbestos from the closed zone into a zone of lower pressure to subdivide said aggregates into fibers of the desired substantially uniform fineness, and recovering the resulting fiberized asbestos.

6. The method of fiberizing unfiberized or partially fiberized crystalline masses of asbestos to produce asbestos fibers of a desired substantially uniform fineness and without substantial change in the original natural length of the fibers, which comprises: confining the asbestos aggregates in a closed zone together with a gaseous medium chemically inert with respect to asbestos under a superatmospheric pressure sufficient to effect fiberization but insufficient to cause detrimental reduction in fiber length, releasing the pressure suddenly to expel the asbestos from the closed zone into a zone of lower pressure through an opening having a minimum dimension at least equal to the maximum natural fiber length of the asbestos being fiberized and to subdivide said aggregates into fibers of the desired substantially uniform fineness, and recovering the resulting fiberized asbestos.

7. The method claimed in claim 1 wherein the pressure ranges from about 200 to about 1200 pounds per square inch.

8. The method claimed in claim 1 wherein the pressure ranges from about 400 to about 800 pounds per square inch.

9. The method claimed in claim 1 wherein the gaseous medium comprises essentially compressed air.

10. The method claimed in claim 1 wherein the asbestos aggregates are confined in the closed zone for a time ranging between about 5 and about 30 seconds.

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