

C. L. PERKINS.  
 METHOD AND APPLIANCE FOR SEPARATING LAMINATED AND FIBROUS MINERALS.  
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1,243,096.

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FIG. 3

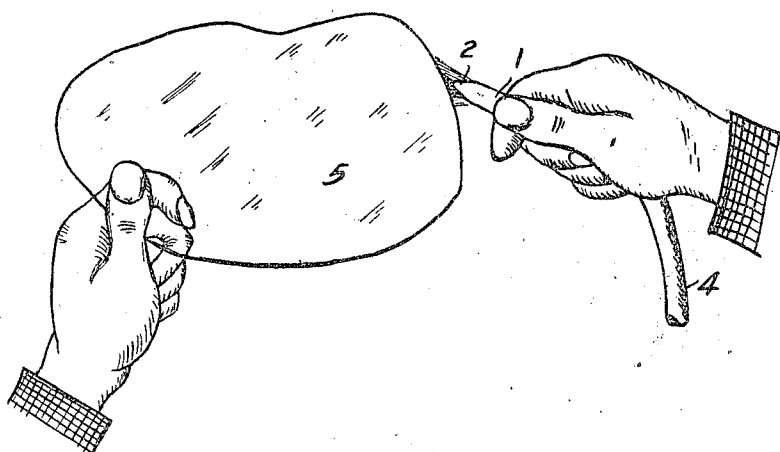


FIG. 1

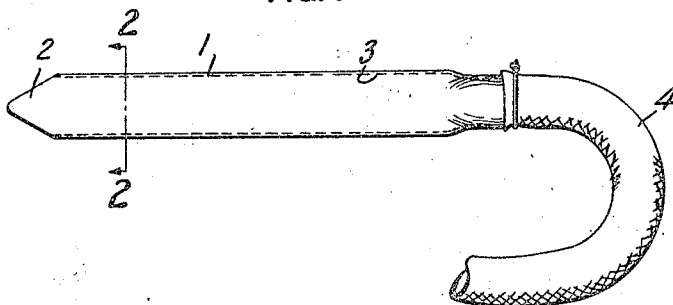
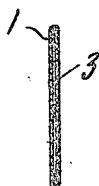


FIG. 2

WITNESSES

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# UNITED STATES PATENT OFFICE.

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METHOD AND APPLIANCE FOR SEPARATING LAMINATED AND FIBROUS MINERALS.

1,243,096.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, CLEMENT L. PERKINS, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methods and Appliances for Separating Laminated and Fibrous Minerals, of which the following is a specification.

This invention relates to a method and appliance for rifting, separating, splitting and scaling laminated and fibrous minerals and mineral products, such as mica, asbestos, and other similar minerals or products thereof, and for removing whole or broken sheets, films, scales or flakes therefrom.

The object of the invention is to provide a method and appliance for the purpose above stated which is simple, effective and rapid in its action, and which provides a more scientific, accurate and economical way of preparing such laminated and fibrous material and products, and which will produce a product or products of superior quality of finish, with less waste, and more economically than heretofore possible.

The invention is particularly applicable to the rifting, separating, splitting and scaling of the laminae of mica and for removing whole or broken sheets, films, scales and flakes from the surface of mica sheets or laminae and preparing the same for use, and hence the invention will be particularly described for such use, but it will be understood that it is adapted for use in connection with any laminated and fibrous minerals or products thereof.

Briefly stated, the invention consists in rifting, separating, splitting and scaling laminated and fibrous minerals and mineral products, by the use of a thin jet of compressed fluid directed against the edge of the piece to be rifted, separated, split or scaled, at the point of desired cleavage, to open up the laminae, and then directing the fluid between the laminae and fibers to complete the separation thereof. The compressed fluid may be of any character, either gaseous (which comprises air), vaporous, such as steam, or liquid, but preferably will be compressed air, and in this specification the invention will be described particularly in connection with the use of compressed air as the separating fluid, but it will be understood that the invention is not limited as to the particular kind of fluid used.

Heretofore the customary practice in rifting, separating, splitting and scaling mica into sheets, films, or scales of varying thickness, has been by the use of wedges, knife blades, and various other more or less sharp or pointed implements and usually manipulated by hand. These prior methods have not only been slow, tedious, and therefore uneconomical, but they have been very wasteful, requiring a high degree of skill on the part of the operator, and even then resulting in a large percentage of sheets, films, scales or laminae which are either broken or too thin to meet the standard requirements, and have also resulted in injury to the sheets, films or scales from mechanical contact therewith of the point of the instrument used, resulting in tearing and breaking the sheets, films, scales or flakes and also scratching the surface or surfaces thereof and otherwise injuring it and leading to the destruction and loss of large quantities of the material, or at least reducing its quality so that it is less valuable and not useful for purposes where mica of superior quality is necessary. The prior methods have also resulted in air blisters, waves, bends, cracks, etc., in the sheets, films or scales, and otherwise injured the same so that it was no longer acceptable as product of superior quality.

For certain purposes, such as in scientific, mechanical and electrical instruments and appliances, a very high standard of quality and perfection of condition of the mica is necessary, and it is also necessary that the sheets, films, scales or laminae should be of a specified thickness, and oftentimes mathematically accurate. By the methods heretofore used, the production of such mathematically correct mica of superior quality has been very difficult and expensive, and only a very small percentage of the sheets, films, scales, flakes, or laminae, meet the exacting standards.

Attempts have also been heretofore made to separate the laminae of mica by means of mechanical devices or machines, but these have been no more effective than the hand methods above described and have not produced product of even as great a degree of accuracy or of as good quality as is produced by the hand methods, and besides they have been quite complicated in construction and their operation has been subject to many dif-

difficulties, notably that of maintaining the block of mica in such position as to be separated into sheets or laminae of the required thickness and so as to produce smooth sheets, films, scales or flakes, free from scratches, air blisters, waves, bent parts, cracks, etc., and have resulted in a very wasteful tearing or breaking of the laminae.

Consequently by the old methods, the production of mica sheets, films, scales or flakes of superior quality and of accurate thickness, such as required for certain scientific, mechanical and electrical devices and appliances, has been costly, due to the small percentage of sheets, films, scales or flakes which can be produced by these old methods of sufficient superior quality and of sufficiently accurate gage to meet the required conditions.

By means of the method and appliance forming the subject of this invention, the above difficulties are largely overcome, and by means thereof mica sheets, films, scales and flakes of superior quality and of required thickness can be produced to a much higher percentage than with the old process and with greater facility and at less cost. By means of the method and appliance, the removal of broken scales from the surface of sheets, films and flakes can also be accomplished in a small fraction of time as compared with other methods and without liability of injuring the surface of the sheet, film, scale or flake.

In the accompanying drawing, Figure 1 is a view of one form of the instrument to be used for rifting, separating, splitting or scaling the mica; Fig. 2 is a transverse section thereof on the line 2-2, Fig. 1, on an enlarged scale; and Fig. 3 is a view illustrating the method of using the implement in carrying out the method.

In the form in which illustrated, the implement described comprises a thin blade 1, preferably having a pointed thin, knife-like end 2, and being provided with a passage therethrough, terminating in a narrow slit or discharge orifice 3 in the end of the implement, and adapted to be connected to any suitable source of fluid pressure, such as by means of hose 4. The form and dimensions of the implement can be varied considerably, depending upon the character of the work to be done. For instance, for rifting or for splitting thick masses of mica, as at the mines, the implement can be large and chisel or wedge shaped, whereas, for separating a small block or an already fairly thin sheet of mica into thin sheets, films, or scales, the implement must be smaller so it can be more easily manipulated, and will be relatively very thin at its discharge end, so that it can be inserted between the laminae of the mica as they are opened up by the compressed fluid.

The degree of fluid pressure will also be varied according to the work to be done, a heavier pressure being permissible in separating thick blocks or thick sheets, than for separating thin sheets, films, scales or flakes. The air pressure can be regulated by any well known device for this purpose, such as reducing valves, and any suitable source of fluid pressure can be utilized.

In the practice of the process, the thin flat jet of compressed fluid is directed against the edge of the mica block, sheet, film or scale, at the point where the cleavage is desired, thus causing the laminae to separate at that point, and permitting the end of the instrument to be introduced between the already separated laminae to separate them by this flat jet of compressed fluid, farther and farther until the separation extends over the entire area of the block, sheet, film or scale. This process can be worked in many different ways. For instance, the block or sheet of mica, such as shown at 5, can be held in one hand, and the implement 1 can be held in the other hand, but if desired the block or sheet of mica can be supported in a fixed or stationary position and the implement guided in proper relation thereto either by hand or by any suitable mechanical appliance; or the instrument can be supported in fixed position and the block or sheet of mica guided in proper relation thereto either by hand or by a suitable mechanical appliance.

The separation of the laminae is effected entirely by directing the thin flat jet of air or other compressed fluid against the edge of the mica block, sheet, film or scale, at the desired point, which opens up the laminae at the proper place, and the separation is accomplished entirely by the entering stream of air. Separation by this method is very rapid, and very seldom results in breaking the laminae, films or scales, and inasmuch as the implement need not come in contact with the laminae, except at the point of entrance, scratching, air blistering and other injury to the surface of or in the laminae is practically obviated. In case any of the laminae, films or scales should break they can be instantly removed by directing the jet of air to the proper point. By this method the wastage is very greatly reduced as compared with prior methods, and sheets, films, scales or flakes of very minute thickness can be readily produced, and said sheets, films, scales or flakes can be produced of more uniform thickness, and a larger percentage of sheets, films, scales or flakes of superior quality can be produced than with the old methods.

In the claims the term "separating" is intended to include the rifting, splitting, or any other separation of laminated or fibrous minerals and mineral products, whether it

be the separation of a thick block into thinner blocks, or the separation of blocks into relatively thick sheets, or the separation of laminae into thinner sheets, films, scales or flakes. The term "scaling" is intended to include the removal from a sheet, film, scale or flake, of any whole or broken or injured scale or laminae. The term "compressed fluid" is intended to include any fluid agent, whether gaseous, vaporous, or liquid, under sufficient compression or head to furnish the necessary force to effect the separation or scaling of the material.

What I claim is:

1. The method of separating and scaling laminated and fibrous minerals and mineral products, which consists in directing a thin flat jet of compressed fluid against the material to be separated, at the point where the separation is to be effected, and separating the material solely by the action of the jet of compressed fluid.

2. The method of separating and scaling laminated and fibrous minerals and mineral products, which consists in directing a thin flat jet of compressed fluid against the edge of the piece to be opened and separated, at the point where the opening and separation is to be effected, and opening and separating the laminae or fibers solely by an entering jet of compressed fluid.

3. The method of separating and scaling laminated and fibrous minerals and mineral

products, which consists in directing a thin flat jet of compressed fluid against the edge of the piece at the point where the separation is to be effected, thereby opening up said edge, and directing the jet of compressed fluid between the separated edges to effect the separation of the laminae throughout their area.

4. Apparatus for separating and scaling laminated and fibrous minerals and mineral products, comprising an implement having a thin pointed edge provided with a narrow slit therein, and having a passage for connection to a source of compressed fluid.

5. Apparatus for separating and scaling laminated and fibrous minerals and mineral products, comprising an implement having a knife-like edge provided with a narrow slit therein, and having a passage connecting said slit with a source of compressed fluid.

6. Apparatus for separating and scaling laminated and fibrous minerals and mineral products, comprising an implement having a pointed knife-like edge provided with a narrow slit therein, and having a passage for connection to a source of compressed fluid.

In testimony whereof, I have hereunto set my hand.

CLEMENT L. PERKINS.

Witnesses:

F. W. WINTER,  
G. H. LERESCHE.