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F. FARROW.

METHOD OF AND APPARATUS FOR COMPACTING PEAT AND OTHER MATERIALS.

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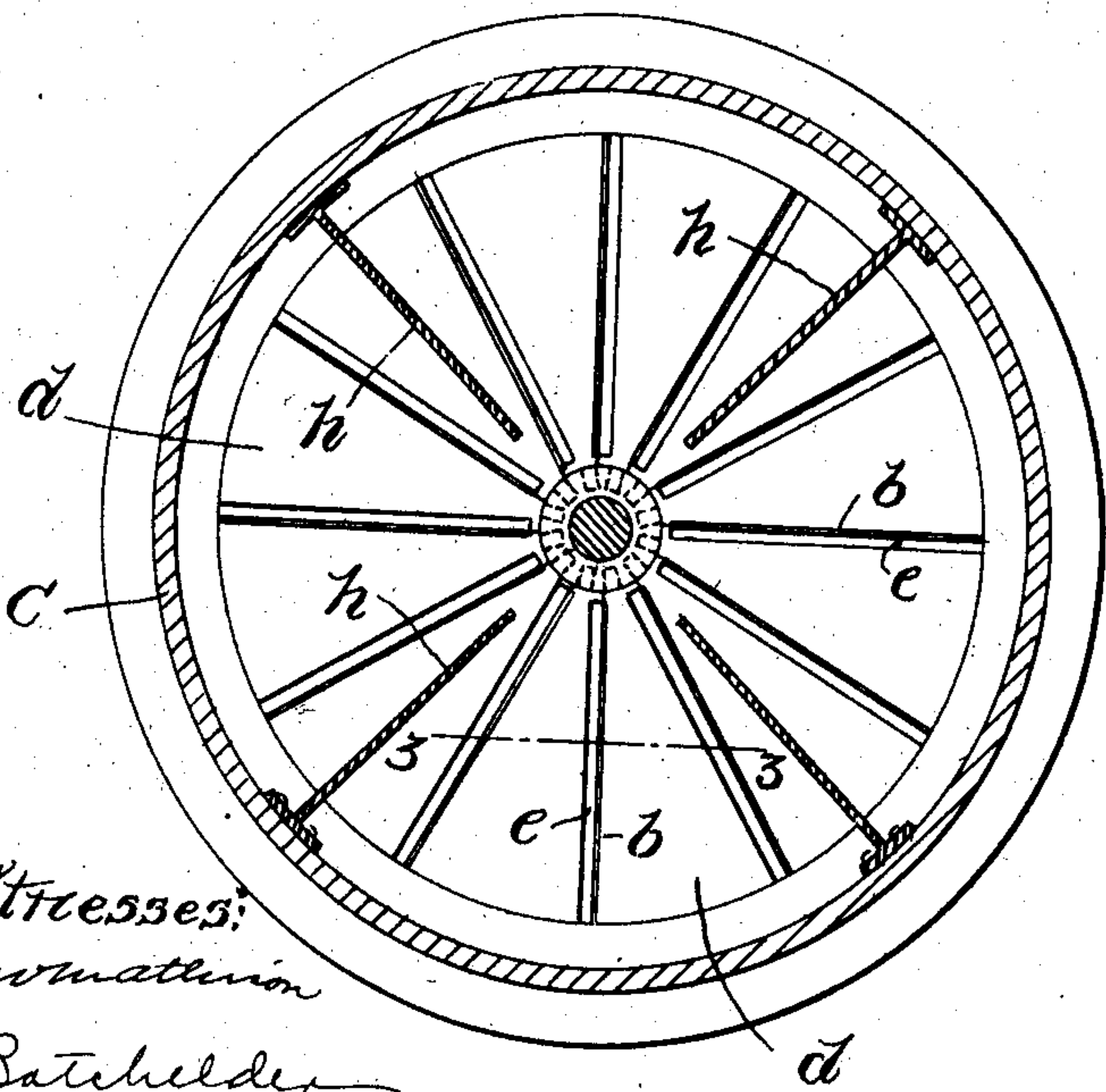
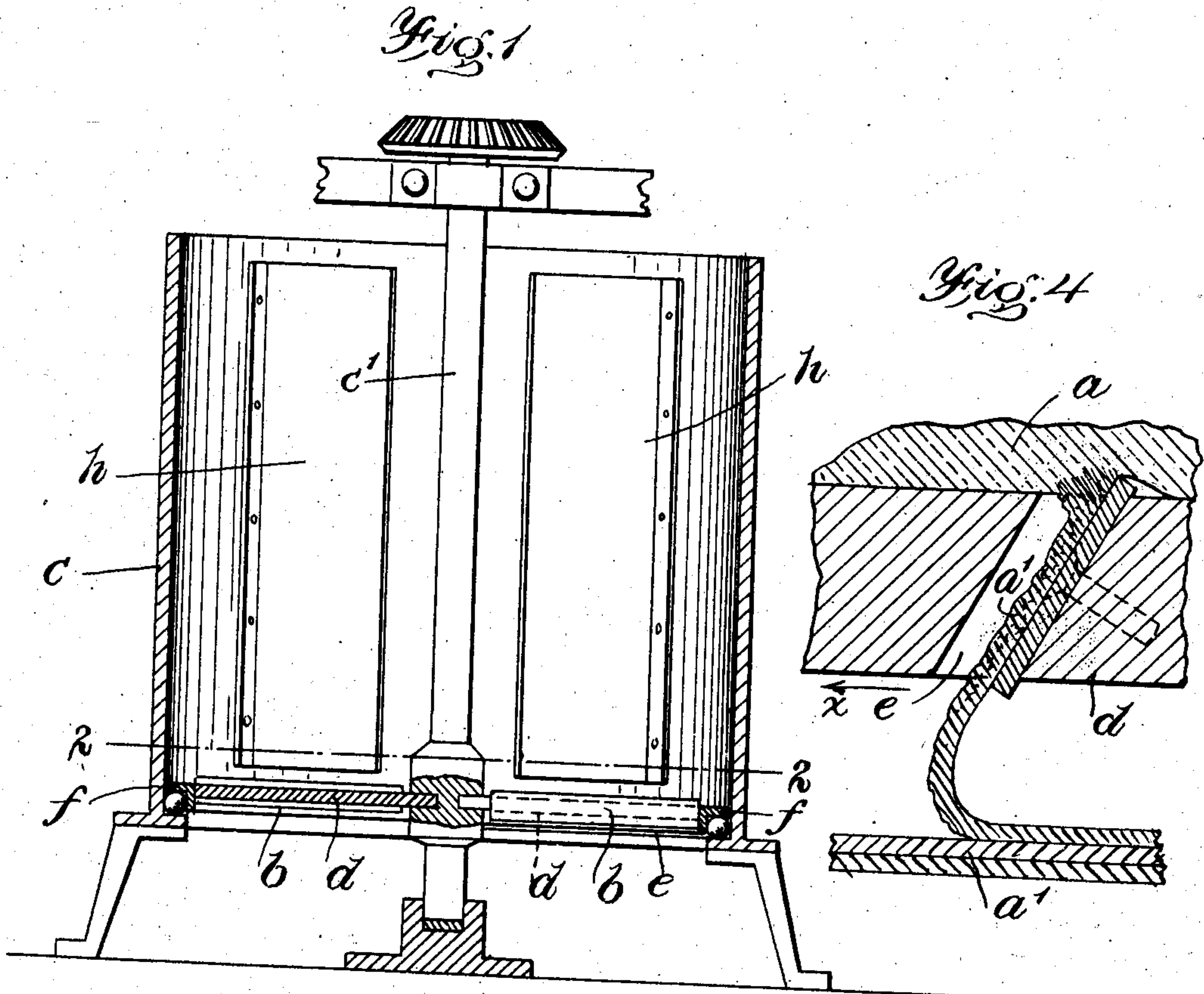


Fig. 2

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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR COMPACTING PEAT AND OTHER MATERIALS.

No. 834,568.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed December 16, 1905. Serial No. 292,044.

To all whom it may concern:

Be it known that I, FRANKLIN FARROW, of Brooksville, in the county of Hancock and State of Maine, have invented certain new and useful Improvements in Methods of and Apparatus for Compacting Peat and other Materials, of which the following is a specification.

This invention has for its object to enable a plastic or semiplastic material, such as peat in its natural condition when taken from the beds or deposits in which it is found, to be rapidly and economically compacted or condensed and put into such condition that it will dry to such hardness and rigidity as to largely deprive the product of the natural friability inherent in peat treated and dried in the usual way.

It is a well-known fact that peat taken from the ground in its natural condition and compressed by a single pressing operation into blocks or masses of suitable size for fuel is not only so friable that it readily crumbles and causes much waste and litter, but is also porous, and therefore liable to absorb moisture.

My invention is based on the discovery that by progressively removing relatively thin portions from the surface of a mass of natural peat or other like material and breaking up or destroying the fibrous structure of the removed material in such manner as to reduce the latter progressively to a pulpy condition I am enabled to rapidly and economically prepare the material for drying and that the material thus prepared is adapted to dry more quickly and at less expense than peat which has not been reduced to pulp prior to drying. I have also discovered that when a strip or shred is removed from one of the faces of a mass of peat by the application of pressure to the portion of the mass from which the shred or strip is removed and in a direction parallel with said face the detached strip or shred is condensed and reduced to pulp and that when dried it becomes exceedingly hard and non-friable, so that a briquet or other body of convenient size for use as fuel may be formed by pressing together or molding a number of such strips or shreds, the product constituting a fuel block or piece which is adapted to be handled without liability of crumbling, is practically moisture-proof, and is capable of burning freely.

The best method which I have devised of progressively converting natural peat into compacted or condensed strips or shreds con-

sists in progressively detaching or slicking a shred or strip from a face of a mass of the material and compressing the portion of the material from which the strip is formed before it leaves the mass in such manner as to crush or close its vesicles and destroy its fibrous structure, the said strip being therefore condensed or compacted, so that the bulk of the material composing it is greatly reduced and the evaporation of the liquid contained therein is greatly facilitated. The increased compactness or density of the material and the quick removal of water and gases therefrom prevent the material from crumbling and from absorbing moisture when dried, the material being rendered homogeneous and deprived of its original cellular or fibrous structure, so that all its particles tend to approach a common center. The shreds or strips when first formed are of such consistency that they may be readily assembled to form a briquet or other body which quickly becomes extremely hard and rigid.

The invention also consists in an apparatus for compacting peat and other like materials, comprising a receptacle having a rotary support on which a mass of the material may rest, shred-detaching members, hereinafter, referred to as "slickers," arranged so that when moved in a direction parallel with the bottom surface of the mass, the latter being prevented from moving, will detach or slick shreds or strips from the mass and will at the same time compress the portion of the material from which the strips are formed and the adjacent surface portion of the material before the strips leave the mass, the said slickers progressively exerting compressing pressure on the bottom portion of the mass of material in a direction parallel with its bottom surface and progressively detaching from the mass shreds or strips of the compressed material.

Of the accompanying drawings, Figure 1 represents a vertical central section of an apparatus embodying my invention. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents an enlarged section on line 3 3 of Fig. 2. Fig. 4 represents an enlargement of a portion of Fig. 3, illustrating my improved process.

The same reference characters indicate the same parts in all the figures.

In carrying out my invention I subject one of the surface portions of a mass *a* of peat, and preferably the bottom portion, to com-

pressing pressure affecting only the bottom portion of the mass and exerted in a direction parallel with the surface of said portion. The said pressure is so applied or exerted that it causes the progressive detachment from the mass of the compressed material in the form of a thin shred or strip a' , the material of which is so compacted and condensed by the pressure that its bulk is considerably reduced, my experiments having demonstrated the fact that it is possible to reduce the bulk of the material about thirty per cent—that is to say, the thickness of the shred or strip a' is about thirty per cent. less than that of the original material from which the strip is formed. The compressing and detaching pressure is best applied by means of a detaching member b , which, as hereinafter set forth, I term a "slicker," arranged so that its upper edge projects into the mass of material, the extent of projection depending upon the thickness of the shred or strip to be removed. I have found that a projection of about one thirty-second of an inch into the mass from its bottom surface is suitable. The weight of the mass of material may, however, be relied upon to depress a portion of it below the front side of the slicker to such an extent that no elevation of the acting portion of the slicker above the general level of the bottom surface of the mass will be necessary. Movement is imparted to the slicker in a direction parallel with the surface of the mass, and the slicker is arranged so that its advancing edge is inclined and stands at an acute angle relatively to the surface of the mass a , as shown in Fig. 4, in which the arrow x indicates the direction of movement of the slicker. The portion of the slicker which acts upon the mass of material is caused by the movement of the slicker and by its inclination to condense or compress the portion of the material of the mass against which it is pressed, so that the fibrous structure of the natural material is destroyed and the density of the mass is materially increased, the slicker acting to detach from the mass the condensed portion as fast as it is formed and to condense the adjacent portion of the mass from which the said portion is removed. The resulting compressed or condensed shred or strip a' passes downwardly across the front side of the slicker b and may be collected in any suitable receptacle below the slicker. When a suitable accumulation of condensed shreds or strips has been formed, the said accumulation may be compressed or molded into a briquet of suitable size and form for use as fuel. When dried, this briquet possesses great strength and rigidity and is at the same time adapted to burn freely.

An apparatus for carrying out the above-described process is shown in the drawings. Said apparatus comprises a receptacle or hopper c , preferably of cylindrical form, a

support in said receptacle for the mass a , said support being rotatable and serving also as a carrier for a series of slickers b , means for rotating the support and the slickers, and means for preventing the mass a from rotating with the support and slickers, so that the mass while bearing against the support and sustained thereby for the action of the slickers is prevented from rotating and remains stationary, while the slickers move horizontally in a path parallel with the bottom surface of the mass. The support and slicker-carrier above referred to is here shown as composed of a series of tapering arms d , radiating horizontally from a central shaft c' , which is journaled in suitable fixed bearings and occupies the central portion of the receptacle c . The upper surfaces of the arms d are substantially flush with each other, so that they collectively support the bottom of the mass a , the adjacent edges of the said arms being separated by narrow passages e , through which the shreds or strips a' are adapted to pass, as illustrated in Fig. 4. The arms d are supported at their inner ends by the shaft, their outer ends being connected by an annular metallic band or rim f , suitably attached to said outer end. Suitable anti-friction-supports, as ball or roller bearings, may be provided for the support above described, so that it may be easily rotated by power applied to the shaft c' . The means for preventing rotary movement of the mass a with the support and slickers may be a series of vertical wings or blades h , affixed to the wall of the receptacle and projecting inwardly therefrom above the rotary support and slicker-carrier.

The above-described apparatus is shown for purposes of illustration. I do not wish to be understood as confining myself to the particular construction here shown and described, it being obvious that an apparatus for accomplishing the described result may be otherwise constructed without departing from the spirit of my invention. So far as the process is concerned, it is obvious that the progressive compression or condensation of the surface portion of the mass, accompanied by the detachment of the compressed material in the form of a condensed shred or strip, may be effected in various ways and by various means. It is not necessary to remove the shred or strip from the bottom surface of the mass, although this is preferable.

It will be seen that the slickers b do not detach the shreds a' by a cutting action, involving little or no compression of the material, but by an action which involves, first, the compression or condensation of the surface portion of the mass with which the slickers are in contact, said pressure crushing the vesicles of said portion and expelling the water and gases therefrom, and, secondly, the forcible removal of condensed surface portions of

the mass in the form of condensed shreds, which are sleeked or slicked off from the condensed surface portions under compression instead of being cut off without compression or condensation by the severing devices. This action is new in the art of compacting or condensing peat and similar materials, and in view of this fact I term it a "slicking" action, the members *b* being therefore properly designated as "slickers." They may be of any suitable form and may have any suitable arrangement adapted to accomplish the described result.

It will also be seen that in carrying out the method as described the fibrous structure of the natural material is broken up and destroyed and surface portions of the material are removed in the form of pulp, the solid particles of which are free to approach a common center, so that liquid and gases contained in the material are liberated and are free to escape to the surface by capillary action, the solid material drying to a desirable degree of hardness. This would not be the case if the material were compressed without destroying its fibrous structure or reducing it to pulp. As is well known, in natural peat the fibrous structure prevents the solid particles from tending toward a common center, whereas when the fibrous structure has been destroyed the particles are free to approach a common center and liquid or air contained in the reduced material is free to escape by capillary action and by the tendency of the solid particles to reach a common center as the mass shrinks. I believe that during the drying of a briquet or mass of peat prepared in accordance with my invention the shrinkage of the solid particles in striving to reach a common center drives out the liquid particles having a less specific gravity. I also believe that in the drying of a briquet or mass of the said prepared peat capillary action is a factor. I have demonstrated that a briquet composed of peat reduced to pulp in accordance with my invention dries much more rapidly than a mass of the same weight in which the fibrous structure has not been destroyed.

I claim—

1. The improved method or process of preparing peat or similar material, the same consisting in progressively removing relatively thin surface portions from a mass of the material, and simultaneously converting parts of said removed material into pulp which is free from the fibrous structure of the natural material.

2. The improved method or process of preparing peat or similar material, the same consisting in progressively removing relatively thin surface portions from a mass of the ma-

terial and simultaneously converting parts of said removed material into pulp, and assembling such converted portions.

3. The improved method or process of preparing peat or other like material, the same consisting in compressing or condensing a surface portion of a mass of the material, and detaching or slicking condensed shreds or strips from said portion.

4. The improved method or process of preparing peat or other like material, the same consisting in progressively detaching or slicking a shred or strip from a mass of the material, and compressing or condensing the portion of the material from which the strip is formed, before it leaves the mass.

5. The improved method or process of preparing peat or other like material, which consists in progressively exerting compressing or condensing pressure on a surface portion of a mass of the material in a direction parallel with the said surface, and progressively detaching or slicking from the mass, a shred or strip of the compressed or condensed material.

6. The improved method or process of preparing peat or other like material, which consists in slicking from a surface of a mass of the material a thin strip, and at the same time, compressing or condensing the material forming the strip.

7. The improved method or process of making solidified bodies of peat, the same consisting in compressing or condensing a surface portion of the material, slicking compressed or condensed shreds or strips from said portion and assembling a plurality of said strips.

8. A compacting or condensing apparatus comprising a receptacle, and material-compressing and strip-forming slickers, movable across a surface portion of a mass of material contained in said receptacle.

9. A compacting or condensing apparatus comprising a receptacle and a rotary support therein, said support having slickers adapted to detach compressed or condensed strips from a mass of material on the support, and outlets for said strips at the forward sides of the slickers.

10. A compacting or condensing apparatus comprising a receptacle, material compressing or condensing and strip-forming slickers, movable across the material contained in said receptacle, and means for preventing the rotation of said material.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRANKLIN FARROW.

Witnesses:

FLORENCE FARROW,
MERRILL FARROW.