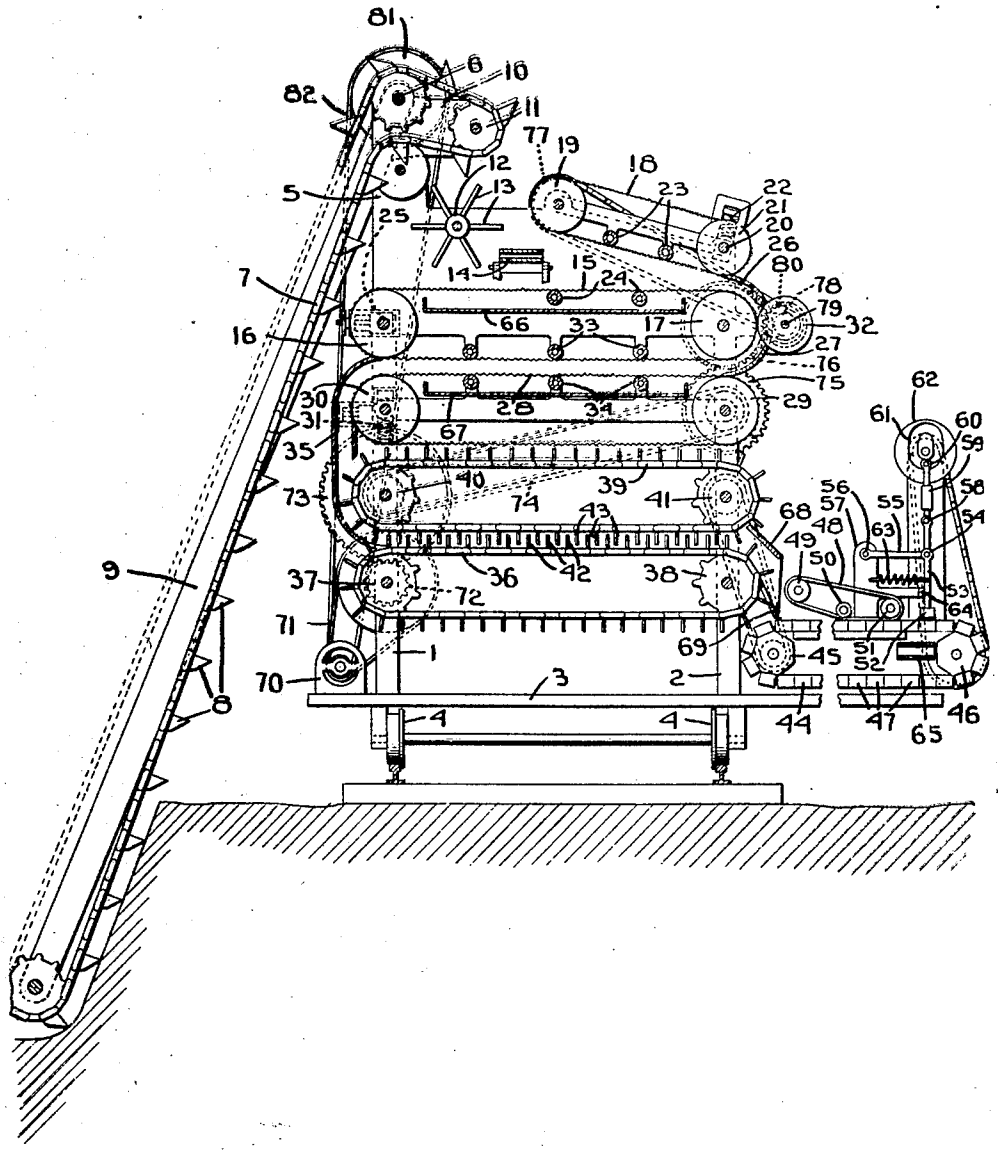
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J. S. BURT

PROCESS AND APPARATUS FOR PRODUCING COMPRESSED PEAT

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Inventor.
John S. Burt
by Heard Smith & Tennant.
Attys.

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JOHN S. BURT, OF WALPOLE, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO FIELD SECURITY COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

PROCESS AND APPARATUS FOR PRODUCING COMPRESSED PEAT.

Application filed October 18, 1923. Serial No. 669,256.

To all whom it may concern:

Be it known that I, JOHN S. BURT, a citizen of the United States, and a resident of Walpole, county of Norfolk, State of Massachusetts, have invented an Improvement in Processes and Apparatus for Producing Compressed Peat, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to improvements in process and apparatus for producing compressed peat and more specifically to the process of winning peat from a bog and compressing the same into blocks of predetermined form.

As it is well known fresh peat from a bog contains approximately from eighty to ninety-five per cent of water, the greater portion of which must be eliminated before the peat is in proper condition to be used as a fuel. The peat when taken from a bog is in the form of a spongy mass, the interstices of which are filled with water and also comprises peat cells which are filled with water so that it has been found difficult to express a sufficient amount of water from the peat by machines heretofore constructed to enable the peat to be economically manufactured.

In machines which heretofore have been produced the peat taken from a bog has been first macerated and then subjected to pressure and sometimes to heat and pressure and thereafter either dried in the open air or artificially. In thus treating the peat from the bog by maceration the fibrous structure of the peat is destroyed and it is formed into a substantially uniform watery mass which has no sufficient structural properties to enable the water to be expressed from it satisfactorily, as the high pressure which is required would force the macerated material through the perforations or screens against which the material is pressed.

The present invention consists broadly in expressing gradually, progressively, and preferably continuously, the water from the peat freshly taken from the bog without so destroying its fibrous nature that the expressing operation can be performed without forcing any substantial amount of the peat through the perforations or reticulations of the conveyer upon which the peat is supported. By this means a relatively thin sheet of perhaps one or two inches more or less in thickness may be produced and which is partially dehydrated.

A further feature of the invention consists in slitting the sheet thus produced into ribbons not for the purpose of breaking down the structural formation of the peat, but for the purpose of presenting fresh exposed surfaces through which the water still retained in the peat may be expressed so that the resulting sheet will be considerably further dehydrated.

A further feature of the invention consists in macerating the sheet which has thus been well dehydrated and forming the same into blocks of suitable form and size which may be readily dried sufficiently for use as fuel. Thus the invention comprises a process of condensing peat taken from a bog which includes gradually expressing the water therefrom by a continuous pressure applied to a moving body thereof carried upon a finely perforated travelling conveyer and further slitting the sheet of peat formed in this manner; then macerating the material of the sheet and finally pressing the same into blocks of suitable form and density.

Any suitable apparatus may be provided for performing the process above described either in whole or in part. A preferred novel form of apparatus for performing the process is illustrated in the accompanying drawing.

The machine shown in the drawing comprises a frame having suitable standards 1 and 2 and cross members (not shown) supported upon a platform 3 which desirably is mounted upon or forms a part of a truck having wheels 4 which may rest upon the rails carried by a platform resting upon a bog or, of course, the frame may be mounted upon a stationary support at any convenient location.

The upper end of the frame desirably is provided with standards 5 carrying a transverse shaft 6 upon which the upper end of a dredge 7 is pivotally mounted. As illustrated herein the dredge 7 is of a sufficient length to extend a considerable distance be-

low the plane of the platform or support for the machine and is provided with a series of flights or buckets 8 adapted to scrape peat from an exposed face of a bog. The endless conveyer progressively cuts through different strata of the bog and delivers to the machine peat of different density according to the stratification in such a manner that as it passes through the machine a substantially uniform product is produced.

The upper portion of the endless conveyer frame 9 is provided with a lateral extension 10 having a guide roller 11 so positioned that the ascending flights on the under side of the conveyer of the dredge will assume a substantially vertical position which will dump their contents into the machine for further treatment.

The upper portion of the machine is provided with a separator for the purpose of separating from the peat the coarser materials which cannot be condensed, such as, sticks, stones, etc. The particular type of separator which is illustrated herein comprises a cylindrical roller 12 which is mounted upon a suitably driven shaft extending transversely of the upper portion of the machine and is provided with a numerous series of pins or teeth 13 which project preferably radially from the roller 12 and serve to break up the peat which is delivered from the conveyer and to discharge the large materials, such as, sticks, stones, etc., upon a chute, or preferably a travelling endless conveyer 14 which extends transversely across the machine.

The peat which passes through the separator is delivered or falls upon the surface of a perforated or reticulated endless conveyer 15 which is mounted upon suitable rollers 16 and 17 carried by the frame and driven in any suitable manner. In order to express the water from the peat by gradually increasing pressure a similar, preferably perforated or reticulated endless conveyer 18 is superposed above the conveyer 15 and converges toward the peat-supporting conveyer in the direction of its movement. The conveyer 18 is mounted at its upper end upon a roller 19 the shaft of which is journalled in a bearing which may be adjusted longitudinally of the frame to take up slack and impose a proper tension upon the endless member. The shaft 20 of the other roller 21 of the superposed conveyer or pressure member 18 desirably is mounted in a bearing which is yieldably mounted and pressed downwardly by a spring 22.

Suitable means for adjusting the pressure of the spring 22 may be employed. A suitable number of pressure rollers 23 may be provided to engage the upper face of the under run of the travelling endless pressure member 18 and similarly a suitable number of supporting rollers 24 may be provided to support the upper run of the perforated endless conveyer 15. Bearings 25, movable longitudinally of the machine, may also be provided for the shaft of the roller 16 by means of which a proper tension upon the conveyer may be imposed. The material is thus pressed with progressively increasing pressure between the endless conveyer 15 and the endless pressure member 18 and the water gradually expelled therefrom and the material delivered by the endless conveyer in the form of a relatively thin sheet of partially dehydrated material.

This sheet of material is directed downwardly around the roller 17, over which the endless perforated or reticulated conveyer travels, by a guide 26 the curved lower portion 27 of which preferably is hinged to the upper portion which is connected to the frame. The sheet is thereby delivered upon the upper surface of another perforated or reticulated endless conveyer 28 which is carried upon rollers 29 and 30 suitably mounted on the frame, the shaft of the roller 30 preferably being yieldably mounted upon a spring-supported bearing 31 which tends normally to force the roller 30 upwardly and further to compress the sheet of material which passes between the upper run of the conveyer 28 and the lower run of the conveyer 15.

In order to provide new surfaces for the sheet of material from which the water can be more readily expelled means are provided for slitting the sheet into ribbons as it passes from the conveyer 15 to the conveyer 28. This is accomplished in the present invention by providing a series of rotatable disks 32 which extend through slots in the section 27 of the guide for the sheet and into proximity to the surface of the roller 17. Thus the material while being pressed between the under run of the reticulated conveyer 15 and the upper run of the reticulated conveyer 28 will be further compressed and the expulsion of water therefrom increased by the fresh surfaces formed by the cutters 32.

Suitable sets of rollers 33 and 34 may be provided for the under run of the conveyer 15 and the upper run of the conveyer 28 to aid in giving a positive, substantially uniform, pressure between these conveyers throughout their adjacent surfaces.

The sheet of material which is delivered from the conveyer 28 is directed by a guideway 35 upon a toothed endless carrier 36 which is mounted upon rollers 37 and 38 carried by the frame. A similar toothed conveyer 39 carried upon rollers 40 and 41 is superposed above the conveyer 36 in such a manner that the pins or teeth 42 upon the conveyer 36 pass between the rows of teeth 43 upon the conveyer 39.

Means are provided for driving the con-

veyers 36 and 39 at different speeds so as to thoroughly macerate the sheet of material which is delivered upon the conveyer 36. The macerated material is delivered from the conveyer 36 upon a molding device which as shown is in the form of an endless conveyer 44 which is mounted upon rollers 45 and 46 and carries a series of molds 47 of any desired form into which the macerated material may be pressed to form blocks or briquets.

Any suitable means may be provided for compressing the macerated material into these molds. In the preferred embodiment illustrated herein an endless belt or pressure member 48 is mounted upon rollers 49, 50 and 51 carried upon an extension of the frame. The lower lead of the conveyer 48 between the rollers 49 and 50 converges toward the mold-carrying conveyer 44 and serves to force the material into the rollers, while the horizontal portion of the conveyer 48 rests upon the molds and completes the packing of the material therein. Either or both of the rollers 50 and 51 may be yieldably mounted if so desired.

The blocks of molded material may be delivered from the molds 47 of the conveyer 44 in any suitable manner. A preferred mechanism for accomplishing this purpose, however, comprises a walking plunger 52 suitably formed substantially to fit the mold and provided with a stem 53 which is pivotally mounted intermediate of its ends upon a stud 54 which is connected to a link 55 the opposite end of which is pivotally mounted upon a stud shaft 56 upon a bracket 57 extending upwardly from the frame or its table.

The upper end of the plunger stem 53 is provided with a pivotal connection 58 to the lower end of an adjustable link 59 the upper end of which is provided with a roll 60 which engages a face cam 61 upon a cam disk 62. A spring 63, connected to the plunger stem 53 and to the bracket 57, tends normally to pull the lower end of the plunger in a direction opposite to the movement of the conveyer belt, and the movement of the plunger in this direction is limited by a stop 64 which is positioned to be engaged by the plunger stem 63.

In the operation of the device the plunger stem 53 resting against the stop 54 is first forced downwardly by the cam and during its downward movement forces the molded material from the mold upon a suitable conveyer, such as an endless conveyer 65 which extends transversely of the machine intermediate of the leads of the conveyer 45. While the plunger 52 is thus being forced downwardly and after it enters the mold it is carried along with the conveyer and this action is permitted by the yielding of the spring 63 and the pivotal movement of the plunger stem 53 about its pivotal connection 54 to the link 55. When the plunger is again raised by the cam the link 55 serves to guide it and also to direct it in its return to the original position.

Any suitable means may be provided for carrying away the water which is expressed from the peat. As illustrated herein suitable troughs 66 and 67 are provided between the leads of the conveyers 15 and 28 respectively, or if desired the conveyers may be so mounted as to be inclined toward one side of the machine so that the water will readily run off.

It may be desirable to provide means for positively removing the peat from the conveyers 36 and 39. For such purpose plates 68 and 69 are supported in any suitable manner, as from the frame of the machine, with the ends of the plates so closely adjacent the surfaces of the conveyers that the peat is scraped therefrom. The ends of the plates are slotted to permit the teeth 42 and 43 to pass by the plates and the slots are preferably of such a size that the sides thereof remove any of the peat which may cling to the pins.

Any suitable means may be provided for driving the conveyers as above described. As illustrated in the accompanying drawing an electric motor 70 is mounted upon the table 3 and drives a belt 71 which rotates the roller 37 of the conveyer 36, thus driving the lower toothed conveyer. A relatively small sprocket wheel 72 upon the shaft of the roller 37 engages a much larger sprocket wheel 73 upon the shaft of the roller 40 of the other toothed conveyer. Thus the upper conveyer is driven much more slowly than the lower conveyer and the rapid passing of the rows of pins 42 of the lower conveyer 36 between the pins 43 of the upper endless member 39 macerates and shreds the material as above described. The roller 29 of the conveyer 28 may conveniently be driven by a sprocket chain 74 from a suitable sprocket wheel upon the shaft of the roller 40 and the upper conveyer 15 may be driven by suitable gears 75 and 76 upon the shafts of the rollers 29 and 17 respectively. The upper pressure member may be driven by means of a sprocket chain which engages at one end with a sprocket wheel 77 fast to the shaft upon which is mounted the roll 19. The sprocket chain may be driven by a sprocket wheel 78 fast to a shaft 79 which in turn is driven by a gear 80 fast to said shaft 79 and meshing with the gear 76. Preferably the dredge is driven by a suitable electric motor (not shown) but operatively connected to a pulley 81 on the shaft 6 by means of a belt 82. The motor may be conveniently mounted upon the table 3 in the rear of the motor 70.

In the operation of the machine the fresh-

ly dug peat is dug from the bog by the flights 8 of the dredge and is carried upwardly above the top of the separating and expressing machine, the flights being thereupon guided horizontally dump their contents upon the rotating separator so that the pins 5 thereof throw the sticks and stones and other coarse materials upon the endless belt 14 which carries them away from the machine. The finer material which passes through the separator is deposited upon the perforated or reticulated conveyer 15 and is gradually pressed down upon that conveyer by the lower lead of the endless pressure member 18. The water is thereby gradually forced out and the partially dehydrated material delivered in a sheet over the roller 17 from which it is directed by the guide 27 upon the upper lead of another perforated or reticulated endless conveyer 28 where it is again pressed between that conveyer and the under lead of the conveyer 15, the pressure gradually increasing as the material approaches the end of the upper lead 28 of the lower conveyer. By this means the greater amount of water is gradually expressed from the sheet, it being remembered that the sheet is slitted by the disks 32 as it passes from the conveyer 15 to the conveyer 28. The sheet of material is then directed by the guideway 35 into the macerating device where it is disintegrated and finally discharged upon the molds 47 of the endless conveyer 45 and pressed into the molds by the endless pressure belt 48. The molded material after passing beyond the pressure belt 48 is ejected from the molds by the walking plunger 52 in the form of blocks or briquets upon the transverse conveyer 65 which delivers it at one side of the machine. These blocks or briquets may then be air dried or treated in any suitable drying machine and thus finally prepared for fuel purposes.

By thus gradually expressing the water from the peat before it is disintegrated a very much larger percentage of the water can be expelled than in other peat machines hertofore constructed and the final maceration of the product enables it to be condensed into bricks or briquets of suitable form which may be readily dried in a relatively short time.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. The process of condensing raw peat freshly taken from a bog which consists in continuously moving the peat directly when taken from the bog and without substantially destroying its normal fibrous composition, and gradually expressing the water therefrom by progressively increasing pressure applied thereto to produce a partially dehydrated sheet.

2. The process of condensing raw peat freshly taken from a bog without destroying its normal fibrous composition which comprises gradually expressing the water therefrom by continuous progressively increasing pressure applied to a moving body thereof to produce a partially dehydrated sheet, slitting the sheet into ribbons to expose new faces and subjecting the slitted sheet to further continuous progressively increasing pressure to form a new sheet of material.

3. The process of condensing raw peat freshly taken from a bog without destroying its normal fibrous composition which comprises gradually expressing the water therefrom by continuous progressively increasing pressure applied to a moving body thereof to produce a partially dehydrated sheet, macerating the partially dehydrated material and molding the same into blocks of predetermined form.

4. The process of condensing raw peat freshly taken from a bog without destroying its normal fibrous composition which comprises gradually expressing the water therefrom by continuous progressively increasing pressure applied to a moving body thereof to produce a partially dehydrated sheet, slitting the sheet into ribbons to expose new faces and subjecting the slitted sheet to further continuous progressively increasing pressure to form a new sheet of material, continuously macerating the moving sheet and molding the material into blocks of predetermined form.

5. An apparatus for producing condensed peat comprising a finely perforated travelling endless conveyer, means for progressively delivering peat taken from a bog directly upon said conveyer, a superposed cooperating endless pressure member converging toward the peat-supporting conveyer acting progressively to express the water from the material thereupon and means for permitting relatively yielding movement between the converging ends of the endless member and conveyer.

6. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog directly to the first of said series, means for delivering the material from each pair of conveyers of the series to the next and means for conducting away the water expressed from the material by each pair of converging conveyers.

7. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next and means for conducting away the water expressed from the material

by each pair of converging conveyers, means for slitting the material during its passage from one pair of co-operating converging conveyers to the next to present freshly exposed surfaces from which the water may be expelled.

8. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next and means for conducting away the water expressed from the material by each pair of converging conveyers and means for macerating the material delivered by the last of the series of co-operating conveyers.

9. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next, means for conducting away the water expressed from the material by each pair of converging conveyers, means for macerating the material delivered by the last of the series of co-operating conveyers comprising travelling toothed members and means for actuating one of the same at a greater speed than that of the other.

10. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next, means for conducting away the water expressed from the material by each pair of converging conveyers, means for macerating the material delivered by the last of the series of co-operating conveyers comprising a toothed material-supporting endless conveyer and a co-operating toothed endless conveyer and means for driving one of said toothed conveyers at a different speed than that of the other.

11. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next, means for conducting away the water expressed from the material by each pair of converging conveyers, means for macerating the material delivered by the last of the series of co-operating conveyers, a continuous series of travelling molds positioned successively to receive the macerated material, means for pressing the material into said molds and means for discharging the molded blocks of material therefrom.

12. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next, means for conducting away the water expressed from the material by each pair of converging conveyers, means for macerating the material delivered by the last of the series of co-operating conveyers, a continuous series of travelling molds positioned successively to receive the macerated material, means for pressing the material into said molds and a walking plunger acting successively to force the blocks of peat from the molds.

13. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next, means for conducting away the water expressed from the material by each pair of converging conveyers, means for macerating the material delivered by the last of the series of co-operating conveyers, a continuous series of travelling molds positioned successively to receive the macerated material, an endless travelling member superposed over said travelling molds acting to compress the macerated material into them and means for discharging the blocked peat from said molds.

14. An apparatus for producing condensed peat comprising a series of pairs of converging perforated endless conveyers, means for delivering peat taken from a bog to the first of said series, means for delivering the material from each pair of conveyers of the series to the next, means for conducting away the water expressed from the material by each pair of converging conveyers, means for macerating the material delivered by the last of the series of co-operating conveyers, a continuous series of travelling molds positioned successively to receive the macerated material, an endless travelling member superposed over said travelling molds acting to compress the macerated material into them and a walking plunger acting successively to force the blocks of peat from the molds.

15. An apparatus for winning peat from a bog comprising a travelling endless dredge acting to scrape the peat from a bog, an endless perforated conveyer positioned to receive the material delivered by said dredge and means acting gradually and with progressively increasing force to express the water from said material during the progress of said endless conveyer and to form the material thereupon into a sheet.

16. An apparatus for winning peat from a bog comprising a travelling endless dredge

acting to scrape the peat from a bog, means for separating coarse materials from the finer material delivered by the dredge, an endless perforated conveyer positioned to receive the material delivered by said dredge, an endless pressure member converging toward said peat-supporting conveyer acting with progressively increasing force to express the water from the material during the progress of said endless conveyer and to form the material thereupon into a sheet.

17. An apparatus for winning peat from a bog comprising a travelling endless dredge acting to scrape the peat from a bog, an endless perforated conveyer positioned to receive the material delivered by said dredge, means acting gradually and with progressively increasing force to express the water from said material during the progress of said endless conveyer and to form the material thereupon into a sheet, means for slitting the sheet of material, a secondary converging pair of superposed endless perforated conveyers positioned to receive the sheet of partially dehydrated material and further to express the water therefrom.

18. An apparatus for winning peat from a bog comprising a travelling endless dredge acting to scrape the peat from a bog, an endless perforated conveyer positioned to receive the material delivered by said dredge, means acting gradually and with progres sively increasing force to express the wate from said material during the progress of said endless conveyer and to form the material thereupon into a sheet, means for slitting the sheet of material, a secondary converging pair of superposed endless perforated conveyers positioned to receive the sheet of partially dehydrated material and further to express the water therefrom, means for macerating the sheet delivered from the last pair of expressing conveyers and means for progressively compressing the macerated material into bricks of predetermined form.

In testimony whereof, I have signed my name to this specification.

JOHN S. BURT.