

W. H. BRADLEY.
 PEAT PREPARING APPARATUS.
 APPLICATION FILED OCT. 3, 1908.

962,120.

Patented June 21, 1910.

2 SHEETS—SHEET 1.

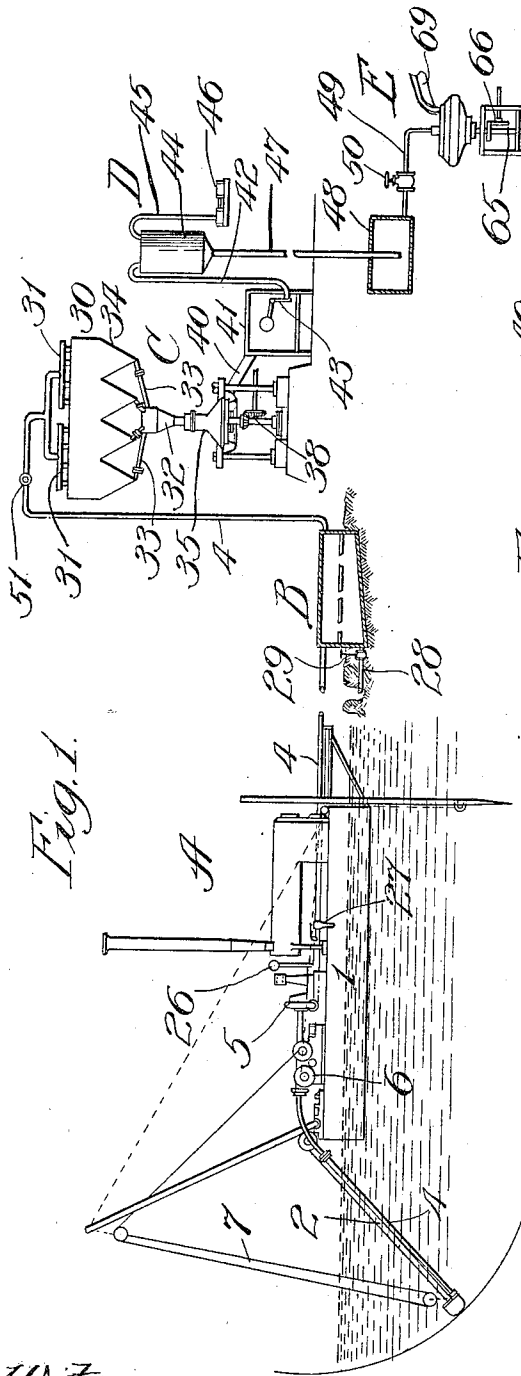


Fig. 1.

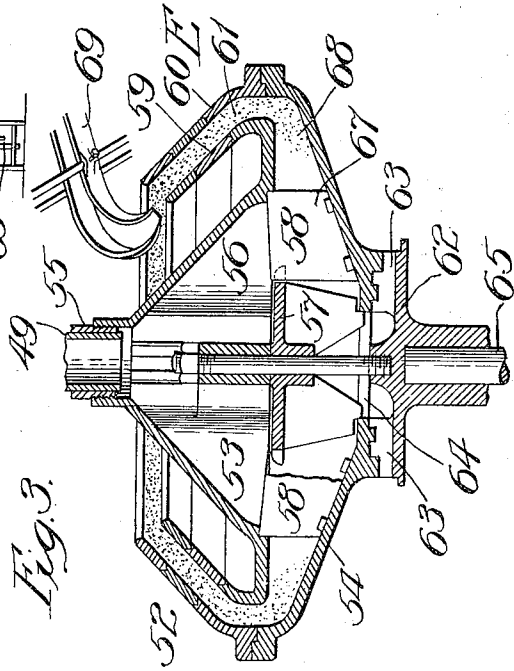


Fig. 3.

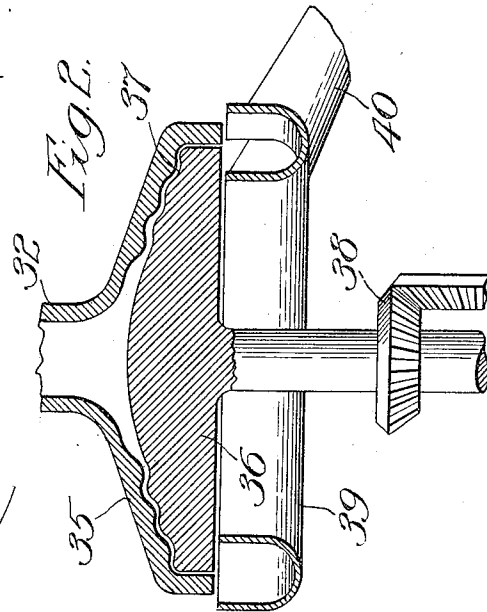


Fig. 2.

Witnesses:
 John Enders.
 Chas. H. Buell.

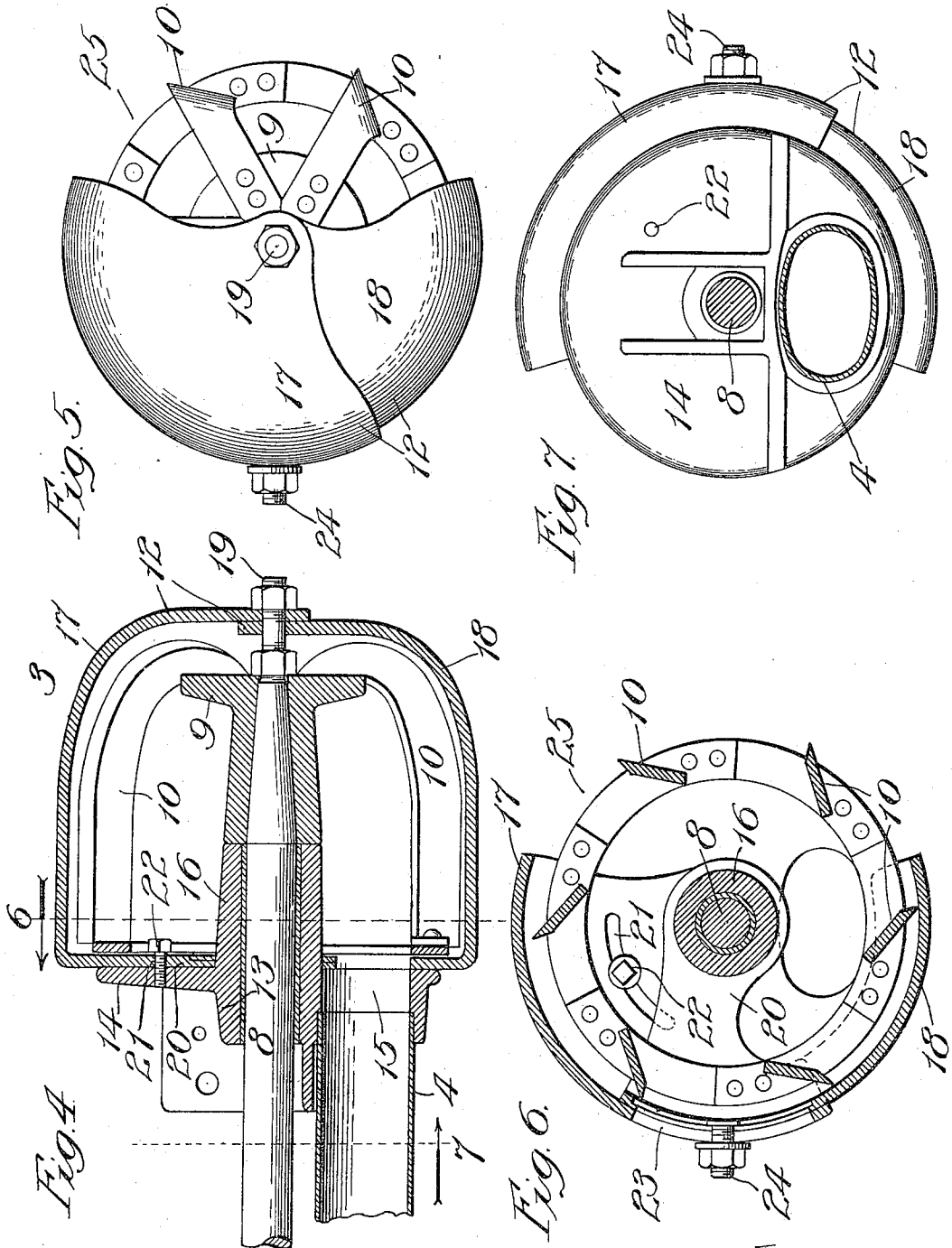
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM H. BRADLEY, OF CHICAGO, ILLINOIS.

PEAT-PREPARING APPARATUS.

962,120.

Specification of Letters Patent. Patented June 21, 1910.

Application filed October 3, 1908. Serial No. 456,045.

To all whom it may concern:

Be it known that I, WILLIAM H. BRADLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Peat-Preparing Apparatus, of which the following is a specification.

My invention relates particularly to apparatus for use in excavating peat from the bog or bed and preparing the same for use as a fuel, or for other purposes.

My primary object is to provide apparatus of simple construction and economical operation capable of excavating peat, separating foreign solids therefrom, and producing a uniform quality of product.

It may be preliminarily stated that my invention comprises, in its preferred embodiment, mechanism for excavating peat and mixing the same with water and conveying the resulting fluid hydraulically; means for separating foreign solids from the fluid during the course of flow; a mixing and grinding machine serving to produce uniformity of quality and complete the maceration of the peat; vacuum apparatus serving to remove air and occluded gases, and a centrifugal separator serving to separate the comminuted peat from the water of suspension.

The improved apparatus may be usefully employed in the practice of the art or process of preparing peat which is described and claimed in my co-pending application Serial No. 452,966, filed September 14, 1908.

The invention is illustrated in its preferred embodiment in the accompanying drawings, in which—

Figure 1 represents my improved apparatus for preparing peat, the view being somewhat diagrammatic in its nature; Fig. 2, a broken sectional view illustrating a grinder employed for completing the maceration of the peat; Fig. 3, a broken sectional view of a centrifugal separator employed for separating the comminuted peat from the water of suspension; Fig. 4, a broken sectional view of a rotary cutter employed; Fig. 5, an end view of the same; Fig. 6, a section taken as indicated at line 6 of Fig. 4; and Fig. 7, a section taken as indicated at line 7 of Fig. 4.

In the construction illustrated, A represents mechanism for excavating peat, mixing the same with water and conveying the same hydraulically; B, means for separat-

ing the foreign solids during the course of flow of the fluid; C, a combination mixing and grinding machine serving to produce uniformity of fluidity and quality and complete the maceration of the peat; D, vacuum apparatus serving to remove air and occluded gases; E, a centrifugal separator serving to separate the comminuted peat from the water in which it is virtually suspended.

In the preferred construction, the mechanism A comprises a boat, or scow, 1 equipped with a vertically-swinging arm 2 upon which is mounted a rotary cutter 3; a conduit 4 connected with the rotary cutter; a pump 5 interposed in the course of said conduit; a motor 6 mounted on the scow, or flat boat, and serving to operate the rotary cutter and the pump; and means 7 serving to actuate the arm 2, said means 7 being also operated by a motor 6.

The rotary cutter 3 comprises a shaft 8 which may be geared in any suitable manner to the motor 6; a cutter-head 9 equipped with blades 10; and a sectionally constructed housing 12 for the rotary cutter. The shaft 8 is journaled in a member 13 which is attached to the arm 2, said member 13 carrying a disk 14 having an opening 15 at its lower portion through which the conduit 4 connects, as shown in Figs. 4 and 7. The disk 14 has a hub 16.

The sectionally constructed housing 12 comprises sectors 17 and 18 having inwardly curved ends pivoted on a stud 19 projecting from the end of the shaft 8 and having inwardly bent rear ends 20 pivoted on the hub 16. The sector 17 has a slot 21 (Fig. 6) which receives a bolt 22 connected with the disk 14, thus providing for angular adjustment and for maintaining the sector 17 in rigid relation to the disk 14. The cylindrical portions of the sectors are provided with slots 23 and are joined thereat by a bolt 24, thus providing for angular adjustment of the sectors with relation to each other. Between the free edges of the sectors 17 and 18 is an opening 25 through which the rotary cutter projects, as shown in Fig. 5.

As stated, the arm 2 is adapted to swing in a vertical plane, and the housing of the cutter is so mounted as to present one side of the cutter to the peat during the upward swing of the arm 2, the cutting being effected during the upward swing of said arm.

The boat 1 may be shifted laterally when necessary to provide for a fresh cut, or the arm 2 may be made to swing universally, if desired. The conduit 4 is provided on the scow with a pressure gage 26 and a relief-valve 27.

The means B for separating the foreign solids comprises a settling tank interposed in the course of the conduit 4, as shown in Fig. 1, said settling-tank being equipped with a discharge-conduit 28 guarded by a valve 29 which may be opened at intervals to discharge the sediment in said tank.

The mixing and grinding machine C comprises an elevated tank 30 with which the conduit 4 communicates through branch conduits 31; a conduit 32 which receives the fluid from the tank 30 through branch-pipes 33 connected with V-shaped recesses 34 in the bottom of said tank 30; a casing 35 at the lower end of the conduit 32 and which may be formed integrally therewith, if desired; a rotary grinding-head 36 contained in said casing 35, it being observed that there is an annular passage 37 between the casing 35 and the rotary head 36, the lower end of the casing 35 being opened to receive the head 36; driving mechanism 38 serving to actuate said rotary head; and an annular trough 39 receiving the fluid from the passage 37 and equipped with a spout 40 serving to deliver the material to a tank 41. The tank 41 is connected, by means of a pipe 42, with the vacuum apparatus D. The orifice of the pipe 42 is guarded by a float-controlled valve 43 located in the tank 41.

The vacuum apparatus D comprises a tank 44 with which the upper end of the pipe 42 communicates; and exhaust-pipe 45 connected with an air-pump 46; and a pipe 47 leading from the tank 44 to a tank 48 which is preferably located a distance of 34 feet or more beneath the tank 44. The tank 48 communicates, through a pipe 49, with the centrifugal separator E. The pipe 49 is guarded by a valve 50. At a point near the point of communication with the mixing and grinding machine C, the conduit 4 is equipped with a valve 51, which may be manually operated, or automatically operated, if desired, to close the conduit 4 in the event that the centrifugal separator shall be stopped.

The centrifugal separator E comprises a rotary casing 52 having top and bottom sections 53 and 54, respectively; a stuffing-box 55 connected with the upper portion of the casing-top 53 and receiving the pipe 49; internal substantially radial flanges 56 which may be formed integrally with the casing-top; a deflector, or separator, 57 interposed between the top and bottom sections of the casing; substantially radial division plates 58 confined between the top and bottom sec-

tions of the casing and encircling the separator 57; up-curved flanges 59 and 60 carried by the peripheral portions of the upper and lower casing-sections affording between them an annular outlet-conduit 61 for the peat, and a hub 62 supporting the lower casing-section and having passages 63 communicating with a central outlet-passage 64 with which the bottom casing-section 54 is provided. A hub 62 is mounted on a vertical shaft 65 operated by gear-mechanism 66 and serving to rotate the casing 52. As clearly shown in Fig. 3, the main wall of the upper casing-section flares downwardly and the main wall of the lower casing-section flares upwardly, and there is thus afforded an annular separating-zone 67 crossed by the division plates 58, and a converging compacting-zone 68 of which the annular conduit 61 between the flanges 59 and 60 forms a continuation. An adjustable plow or blade 69 dipping into the annular conduit may serve to cut the plastic peat from the annular conduit, as the casing rotates.

The manner of using my improved apparatus will be readily understood from the foregoing description. An operator stationed on the boat 1 operates the mechanism for excavating the peat, mixing it with water and conveying it hydraulically; and another operator oversees the operation of the machines C, D and E. The material is cut or shaved from the vertical face of a peat bed during the upward swing of the arm 2, and the peat and water are drawn into the cutter-housing and forced through the conduit 4 to the mixing and wet-pulverizing machine, where uniformity of quality and fluidity are attained, and the fibrous structure of the peat destroyed. The material then passes through the vacuum apparatus where air and occluded gases are removed, the cellular structure of the peat being still further broken up. In the final condition of the fluid before it enters the centrifugal separator E, the peat is in a practically complete condition of maceration, being finally comminuted and suspended in water, the fluid being of about the consistency of cream. The fluid then passes through the revolving separator E, where the comminuted peat is separated from the water of suspension, the peat emerging through the peripheral channel 61 in a firm plastic condition. In the construction illustrated, the flanges 59 and 60 are sectionally constructed, enabling them to be reduced in extent, thereby producing the back pressure of the peat emerging through the annular channel 61. At the beginning of the operation of the machine, the channel 61 is preparatorily packed with dirt or clay, which may be accomplished by filling the casing with clay and rotating it, thereby packing the material into said channel. The mate-

rial thus preparatorily introduced acts as a resisting medium, preventing the fluid from passing out through the peripheral annular channel of the machine during the first stages of the operation. Thereafter, the peat, as it is separated from the water of suspension, is packed within said annular channel, forcing the preparatorily placed packing ahead of it, the peat becoming self-sealing. As the fluid enters the machine E through the conduit 49, it is caused to rotate with the machine, and passes over the periphery of the separator 57 into the separating-zone 67, the division plates 58 serving to prevent any washing action or eddying action which might break the seal in the annular peat outlet of the machine. The peat, as it is separated, is forced through the compacting-zone 68 and thence through the channel 61 which forms a continuation thereof, while the water emerges through the lower central opening 64 and out of the channel 63.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitation should be understood therefrom.

What I regard as new, and desire to secure by Letters Patent, is—

1. In apparatus for preparing peat, the combination of mechanism for excavating peat from the bed and mixing sufficient water therewith to suspend the peat therein, mechanism for comminuting the peat in water and accomplishing its complete maceration therein and producing uniformity of consistency and quality, and a centrifugal machine operative to separate the comminuted peat from the water and to expel the peat through a peripheral opening and the water of suspension through a more central outlet.

2. In apparatus for preparing peat, the combination of means for breaking up and mixing the peat with water, means for separating mineral substances therefrom, mechanism for continuing the maceration of the peat in water till a uniform state of suspension of particles is reached, and a centrifugal machine operative to separate the water of suspension from the peat and to expel the peat through one outlet and the water of suspension through another outlet.

3. In apparatus for preparing peat, the combination of mechanism for breaking up and suspending in water the peat in fine particles, means for conveying the resulting fluid hydraulically, and a centrifugal separator receiving said fluid and serving to separate the peat from the water of suspension.

4. In apparatus for preparing peat, the combination with means for reducing the peat to a state of thorough maceration in water, of a centrifugal separator serving to

separate the comminuted peat from the water of suspension and cause the peat to issue through a peripheral outlet and the water of suspension to issue through a more central outlet.

5. In apparatus for preparing peat, the combination of peat-excavating and water-mixing mechanism, means for separating foreign solids, vacuum apparatus serving to remove air and occluded gases, and mechanism for separating the peat from water of suspension.

6. In apparatus for preparing peat, the combination of peat-excavating and water-mixing mechanism, vacuum apparatus serving to remove air and occluded gases, and a centrifugal separator serving to separate the peat from the water of suspension.

7. In apparatus for preparing peat, the combination of peat-excavating and water-mixing mechanism, means for separating foreign solids, means for completing the maceration to a state of fine particles suspended in water and producing uniformity of quality and fluidity, and a centrifugal separator serving to separate the comminuted peat from the water of suspension.

8. In apparatus for preparing peat, the combination of peat-excavating and water-mixing mechanism, means for conveying the fluid hydraulically, mixing and macerating mechanism serving to complete the maceration to a point of suspension in fine particles and produce uniformity of quality and consistency, and a centrifugal separator receiving said fluid and serving to separate the comminuted peat from the water of suspension.

9. In apparatus for preparing peat, the combination with peat-excavating and water-mixing mechanism, comprising a rotary cutter, a housing therefor provided with an adjustable water-inlet, and means for elevating the peat and water from said housing, of means for separating the water of suspension.

10. In apparatus for preparing peat, the combination with peat-excavating and water-mixing mechanism, comprising a rotary cutter, a chamber containing the same having an adjustable opening through which said rotary cutter protrudes, and suction-mechanism connected with said housing, of a centrifugal separator serving to separate the peat from the water of suspension.

11. In apparatus for preparing peat, the combination of means for cutting and elevating peat and mixing water therewith, means for conveying the resulting fluid hydraulically, means for effecting mixing of said fluid, grinding-means receiving said fluid and serving to complete the maceration of the peat, and a centrifugal separator serving to separate the comminuted peat from the water of suspension.

12. In apparatus for preparing peat, the combination of mechanism for excavating and mixing the peat with water, means for conveying the resulting fluid hydraulically, 5 means for separating foreign solids from said fluid during its course of flow, grinding-means serving to receive said fluid and complete the maceration of the peat, vacuum apparatus serving to remove air and occluded gases, and a centrifugal separator 10 serving to separate the comminuted peat from the water of suspension.

13. In apparatus for preparing peat, the combination with mechanism for elevating 15 the peat and mixing the same with water and conveying the same hydraulically, a mixing machine receiving the fluid, a centrifugal separator connected with said mixing machine, and means for indicating excess of pressure in the hydraulic conveying 20 means in the event of the stopping of the operation of said centrifugal separator.

14. In apparatus for preparing peat, the combination of a centrifugal machine, a conduit leading thereto equipped with air-exhausting means, means for excavating peat 25 and mixing water therewith and conveying the same through said conduit, and an automatically closing valve guarding said conduit. 30

15. In apparatus for preparing peat, the combination of mechanism for cutting peat, mixing the same with water and conveying the resulting fluid hydraulically, including a 35 conduit through which the fluid is conveyed, of vacuum apparatus connected with said conduit, an automatically closing valve guarding the passage to said vacuum appa-

ratus, and a centrifugal machine receiving the fluid from the vacuum apparatus and serving to separate the comminuted peat 40 from the water of suspension.

16. The combination with peat-cutting means, of a conduit connected therewith, means for forcing the peat and water 45 through said conduit, a centrifugal separator for separating the peat from the water, a valve controlling the supply to said separator, and means for indicating excess pressure in said conduit in the event of said 50 valve being closed.

17. The combination with means for excavating peat, mixing water therewith and elevating the resulting fluid to a desired head, of a rotary grinder receiving the fluid under 55 said head of pressure, and a centrifugal separator serving to receive the fluid after its passage through said grinder and separate the comminuted peat from the water of suspension. 60

18. The combination with means for excavating peat, mixing the same with water and conveying the resulting fluid hydraulically through a conduit, of a relief-valve connected with said conduit, a centrifugal separator receiving its supply from said conduit, and a valve controlling the supply to said centrifugal separator, said relief-valve serving to reduce the pressure in said conduit in the event that the valve controlling 70 the passage to said centrifugal separator should be closed.

WILLIAM H. BRADLEY.

In presence of—

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R. A. SCHAEFER.