Aug. 18, 1925. 1,550,045

M. J. POWER

BARK COMPRESSING MACHINE

Filed May 29, 1922 2 Sheets-Sheet 1

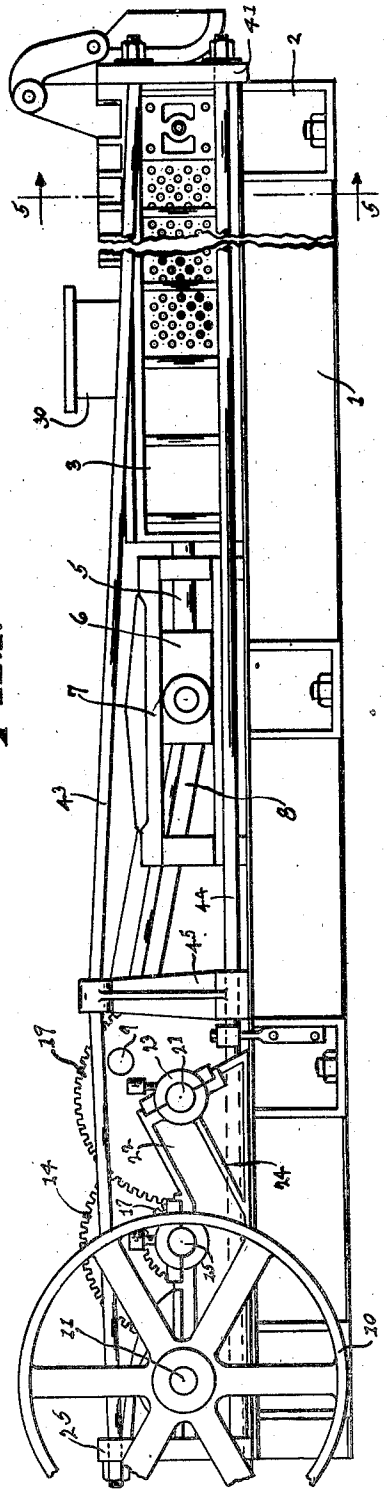

FIG. 1.

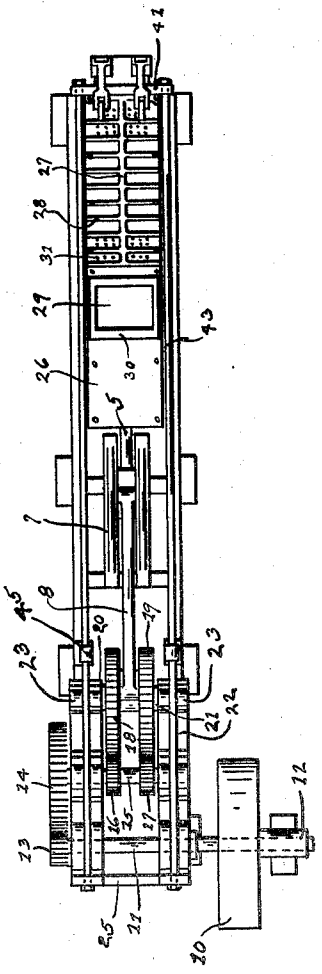

FIG. 2.

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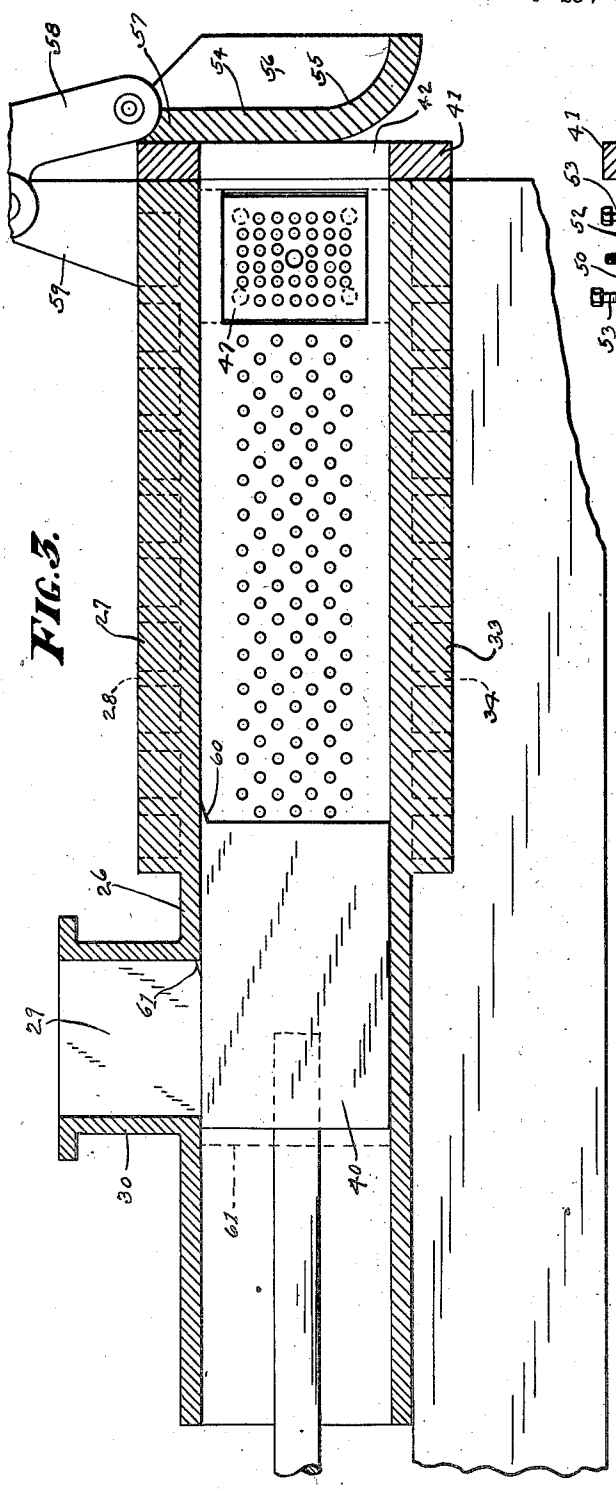

FIG. 3.

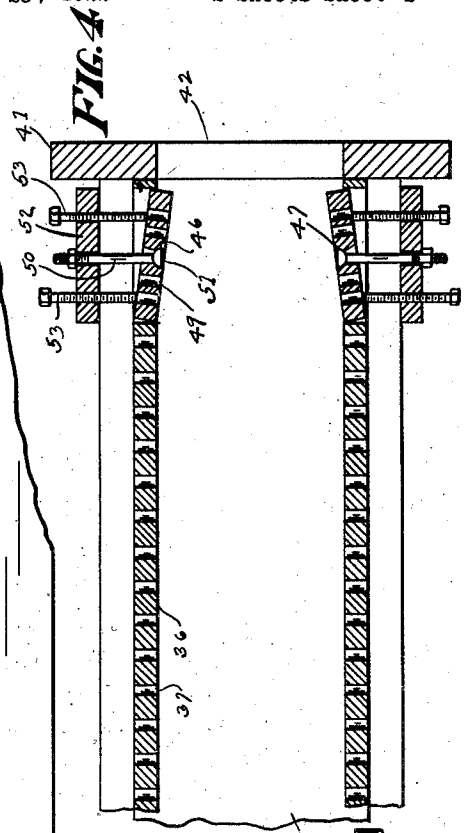

FIG. 4.

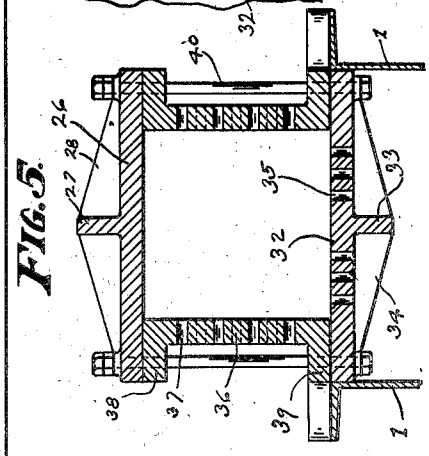

FIG. 5.

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UNITED STATES PATENT OFFICE.

MICHAEL J. POWER, OF NEKOOSA, WISCONSIN.

BARK-COMPRESSING MACHINE.

Application filed May 29, 1922. Serial No. 564,626.

To all whom it may concern:

Be it known that I, MICHAEL J. POWER, a citizen of the United States, residing at Nekoosa, county of Wood and State of Wisconsin, have invented new and useful Improvements in Bark-Compressing Machines, of which the following is a specification.

This invention relates to compressing devices and is particularly directed to a machine for compressing water-soaked bark.

In handling logs, it is the usual practice to float them to the mill at which they are to be sawed. These logs become water-soaked particularly the outer or bark potion. When they arrive at the mill the bark is removed, but in its water-soaked condition is unfit for use as fuel. Any drying by heat necessarily involves a considerable expense and loss of time. However, it is extremely desirable to utilize the bark as it has considerable value as fuel.

It is, therefore, an object of this invention to provide a machine which will rapidly compass the bark and render it immediately available as fuel without any further treatment; and to provide a machine which will compact the loose, or separate, fragments of the bark into units of such size and contour that they may be expeditously handled in firing any of the usual types of furnaces.

Further objects of this invention are to provide a bark compressing machine which will continuously receive the loose water-soaked bark and deliver it in a compacted dry state; which will break the compacted, exuded bark into lengths suitable for ready handling; which is provided with means to allow the ready escape of the water pressed from the bark; which is devoid of fragile or complicated parts; to provide a machine which is of rugged construction, and in which the stresses are distributed throughout the body of the machine in a highly efficient manner; and to provide a machine in which the cylinder, in which the bark is compressed, is substantially unobstructed throughout its extent.

An embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a side elevation of a bark compressing machine.

Figure 2 is a plan view of the machine, such figure being drawn upon a smaller scale than that used in Fig. 1.

Figure 3 is a vertical, fragmentary, sectional view upon an enlarged scale of the rear end of the machine.

Figure 4 is a horizontal sectional view of such rear end.

Figure 5 is a sectional view taken on line 5—5 of Fig. 1.

The machine comprises a chassis or bed portion 1 to which are secured a plurality of attaching feet 2, which are adapted to be bolted to the concrete or other base portion, the chassis conveniently being formed of a pair of flanged side bars as may be seen from Figs. 1 and 5. Upon this bed portion a rectangular cylinder, indicated generally by the reference character 3, is securely fastened. A rectangular piston 4, see Fig. 3, is mounted to freely slide within this cylinder,—such piston being provided with a piston-rod 5, one end of which is carried by a cross-head 6. The cross-head 6 is suitably slidably held by means of the guiding members 7 and 8, upon which it is adapted to slide. This cross-head is connected by means of a pitman 8 with the crank 9 of the driving mechanism. The driving mechanism comprises a belt receiving pulley 10 mounted upon a transverse shaft 11,—such shaft being suitably journalled upon the bed portion and being provided with outside bearings 12, see Fig. 2. This driving shaft 11 is provided with small pinion 13 adapted to mesh with a larger gear wheel 14,—the gear wheel being rigidly fastened upon a transverse shaft 15. A convenient way of arranging the gears, is to mount the gears 13 and 14 upon the outer side of the machine, and to provide a pair of relatively small pinions 16 and 17 rigidly secured to shaft 15 and positioned between the outer or side portions of the machine. The small pinions 16 and 17 mesh with relatively large pinions 18 and 19, which are joined by means of the crank-pin 11, and are provided with stub shafts 20 and 21. These trunnions or stub shafts 20 and 21 are journalled in relatively massive brackets 22, each of which have an angular face upon which bearing cap 23 is suitably secured. Flanges 24 are formed upon each of these brackets and extend downwardly and forwardly from the bearing so as to suitably

reenforce the brackets 22. These brackets are secured to the respective side members or bottom portion and extend to the forward portion of the machine and abut against a forward end plate 25.

The rectangular cylinder 3 comprises a top member 26 which is provided with a central rib 27, and a plurality of relatively short, tapered, transverse ribs 28 so as to secure the maximum strength against distortion. This top portion is provided with a rectangular opening 29 which communicates with an integrally formed, upwardly extending, hollow casing 30, the casing 30 forming the lower portion of the hopper, not shown, for receiving the loose water-soaked bark. This top member 26 may be foraminous throughout either a portion of its length, or throughout its full extent,—such top member conveniently being provided with a plurality of openings 31 arranged between the transverse ribs 28. The bottom of the cylinder is formed in a manner substantially similar to that of the upper plate, except that it is not provided with a rectangular opening 29. It comprises a plate 32 similarly equipped with a longitudinal rib 33, and with relatively short, tapered, transverse ribs 34. This plate is provided with a plurality of openings 35 preferably formed throughout its major extent. The side portions of the rectangular cylinder are formed by channel-shaped side members 36 which are foraminous,—the openings 37 therethrough being regularly spaced throughout their major extent,—that is to say, throughout the active or operating portion of the cylinder. The upper and lower flanges 38 and 39 are provided at suitable intervals with apertures through which bolts 40 are passed,—such bolts firmly tying the upper and lower plates 26 and 32 together and to the side walls. It will be noted that by this construction the stresses tending to separate the upper and lower plates are directly borne by these bolts or tie rods, and that in addition to the frictional grip between the flanges 39 and 40, and the upper and lower plates, respectively, there is also provided the additional security attained by passing the bolts 40 through the flanges 38 and 39. In this manner the bolts not only act as tie rods, but as pins to prevent the sidewise motion of the side members or plates 36.

This rectangular cylinder extends to the rear end of the machine and abuts a relatively massive terminal plate 41 which is provided with a rectangular opening 42 corresponding exactly to the rectangular cross-sectional interior contour of the cylinder. This end plate 41 is tied to the forward end plate 25 by means of a plurality of tie rods 43 and 44 extending from adjacent each of the four corners of such rear end plate to the corresponding four corners of the forward plate. The bottom tie rod extends in a substantially straight line to the forward end plate,—the upper tie rod being held in a slightly upward bowed condition by means of brackets 45 mounted upon each side of the machine. By this upward bowing of the upper tie rod 43, suitable space is left for the oilers and oiler bearings and other portions of the apparatus.

The rear portion of the cylinder 3 has a pair of movably or adjustably mounted members 46 and 47, see Figs. 3 and 4. These members are rectangular and form a continuation of the side walls or cylinders,—such members being preferably provided with a plurality of holes 49 in a manner similar to the side walls. These members are held in position by means of bolts 50 which have semi-spherical heads 51 socketed in the members. The outer ends of these bolts extend loosely through side plates 52 secured in any suitable manner to the sides of the cylinder. These side plates are provided with threaded apertures through which a plurality of bolts 53 pass. It will be seen from this construction, that the side plates 46 and 47 may be adjusted to any desired angular position. It is preferable, however, to so adjust them that their forward edges are flush with the inner walls of the cylinder and with their rear edges spaced inwardly of the plane of the inner surface of the side walls of the cylinder. In this manner the cylinder is gradually contracted sidewise so that a smaller cross-sectional area is provided at the rear portion of the cylinder. It is to be noted, however, that these plates project inwardly or constrict the cylinder to a very limited extent so that the cylinder is substantially unobstructed throughout. In practice it has been found that with a cylinder having substantially one square foot of cross-sectional area that it is necessary to adjust the side plates inwardly to only approximately one-half an inch.

The rear portion of the machine is provided with a swinging door which may conveniently be formed of a channel cross-section having a web 54 extending vertically downwardly in normal position, and curving outwardly as indicated at 55 adjacent its bottom portion. Side walls, or flanges, 56 are provided to secure the requisite strength and weight. This door terminates in upwardly extending lugs 57 which are joined by means of links 58 with lugs 59 projecting upwardly from the top plate 26 of the cylinder.

The operation of the machine is as follows:—Water-soaked loose bark is fed into the hopper portion 30, while the machine is in operation, the reciprocatory piston 4 being continuously reciprocated by the reduc-

tion gear and crank mechanism at the forward end of the machine. As the piston moves inwardly a horizontal knife 60, carried adjacent its upper rear edge, co-operates with a similar horizontal knife 61, formed within the rectangular opening 29 and carried by the upper plate 26, thereby severing any bark or other material part way in and part way out of the cylinder. It is to be noted that when the piston moves rearwardly, it may reciprocate into a position such that its rear edge occupies the dotted line position 61, indicated in Fig. 3, thereby permitting the bark to freely pass into the cylinder. This bark is forced inwardly by the piston upon its working stroke and thereby slid rearwardly along the cylinder. When the piston is retracted a fresh charge of bark drops into the cylinder and is pressed against the side of the slightly compacted bark ahead. When this bark reaches the contracted rear end of the cylinder, greater frictional resistance is offered and the bark tends to clog and wedge within the cylinder. In starting the machine, it may be found expedient to press the door against the outwardly moving bark, so as to further aid in securing this initial frictional resistance. However, as the machine continues to operate, bark is wedged tighter and tighter in the constricted rear portion of the cylinder, until finally, during the normal operation of the machine, the bark is continuously exuded or pressed outwardly through the open end of the cylinder. It has been found that by the slight constriction offered by the plates 46 and 47, that an enormus pressure has to be exerted by the piston upon the bark. This bark, therefore, will be highly compressed and compacted, and the water will flow through the foraminous walls of the cylinder. As the solid, rod-like, compacted bark passes outwardly, it swings the rear door upwardly. However, when this bark sticks out a sufficient distance, the weight of the door will break it into suitable lengths so that it may be readily handled.

In the actual operation of this machine, it has been found that the bark is very highly compressed and that the water flows in small streams from the apertured walls of the cylinder. The bark delivered by this machine is freed from a very large proportion of the water, initially carried thereby, and is, at least, as dry as it was in its original state. In fact, the chunks of compressed bark are suitable for immediate use as fuel without any subsequent treatment or drying.

It will, thus, be seen that a bark compressing machine has been provided which is highly efficient in operation; which will produce compacted, dried bark from water-soaked loose bark; which is so designed that it is rugged and simple in construction, and in which the stresses are properly distributed throughout the machine. It will also be seen that the cylinder is substantially unobstructed, and that no delicate parts are employed.

I claim:

1. A bark compressing machine comprising a foraminous cylinder, a hopper leading to such cylinder, a piston freely fitting said cylinder, means for reciprocating said piston with said cylinder, and means adjustable to a plurality of fixed positions for slightly constricting the rear portion of said cylinder, whereby the outwardly pressed bark will co-operate with the constricted portion of the cylinder to attain the desired frictional resistance greater than the normal resistance of the cylinder proper, thereby permitting a relatively high degree of compression.

2. A bark compressing and drying machine comprising a foraminous cylinder, a piston mounted therein, means for reciprocating said piston, means for feeding loose moist bark into said cylinder, means for increasing the frictional resistance offered the rearwardly pressed bark, and means for breaking the outwardly exuded bark into suitable lengths.

3. A bark compressing and drying machine comprising a cylinder of rectangular contour having ribbed upper and lower plates, channel-shaped side plates and transverse tie rods joining and binding said plates together, said cylinder having a plurality of outwardly opening apertures, an adjustable, non-yieldable portion forming a part of the rear end of said cylinder and adapted in adjusted position to constrict the cross-sectional area of said cylinder, and a reciprocatory plunger positioned within said cylinder and adapted to compress and force moist bark rearwardly through said cylinder and outwardly past the constricted portion.

4. A bark compressing machine having a foraminous cylinder, a plunger loosely mounted within said cylinder, mechanism for reciprocating said plunger, a plurality of adjustable non-yieldable means for constricting the rear portion of said cylinder, and longitudinal tie rods for holding said mechanism and cylinder in proper spaced relation.

5. A bark compressing machine comprising a cylinder having means for allowing water to pass outwardly therethrough and having a constricted rear end, a piston mounted within said cylinder, means for reciprocating said piston, a hopper through which loose, moist bark may be passed to said cylinder, and means at the rear portion of said cylinder and adapted to break off lengths of the compressed dried bark.

6. A bark compressing and drying ma-

chine comprising a cylinder provided with a plurality of apertures through which water may pass outwardly, a piston mounted within said cylinder, means for reciprocating said piston, a hopper for conducting moist, loose bark into said cylinder, means slightly constricting the rear end of said cylinder, a relatively heavy door hung by links from a point above the rear end of said cylinder and adapted by its weight to bear against the exuded compressed bark, and thereby break it into lengths.

7. A compressing machine having a cylinder open at one end and provided with an adjustable member for constricting said opening, said member having an intermediate pivot and adjustable means upon each side of said pivot for varying the angular setting of the first mentioned member.

8. A compressing machine having a cylinder open at one end and provided with an adjustable member for constricting said opening, said member having pivot intermediate thereof and adjustable means for varying the angular setting of said member about said pivot.

9. A compressing machine having a cylinder open at one end and provided with an adjustable member for constricting said opening, said member having an intermediate pivot adjustable laterally of the cylinder and adjustable means for varying the angular setting of the first mentioned member.

MICHAEL J. POWER.