No. 729,149. PATENTED MAY 26, 1903.

G. M. FENN.

MACHINE FOR MAKING ARTIFICIAL FUEL BRIQUETS.

APPLICATION FILED MAR. 28, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

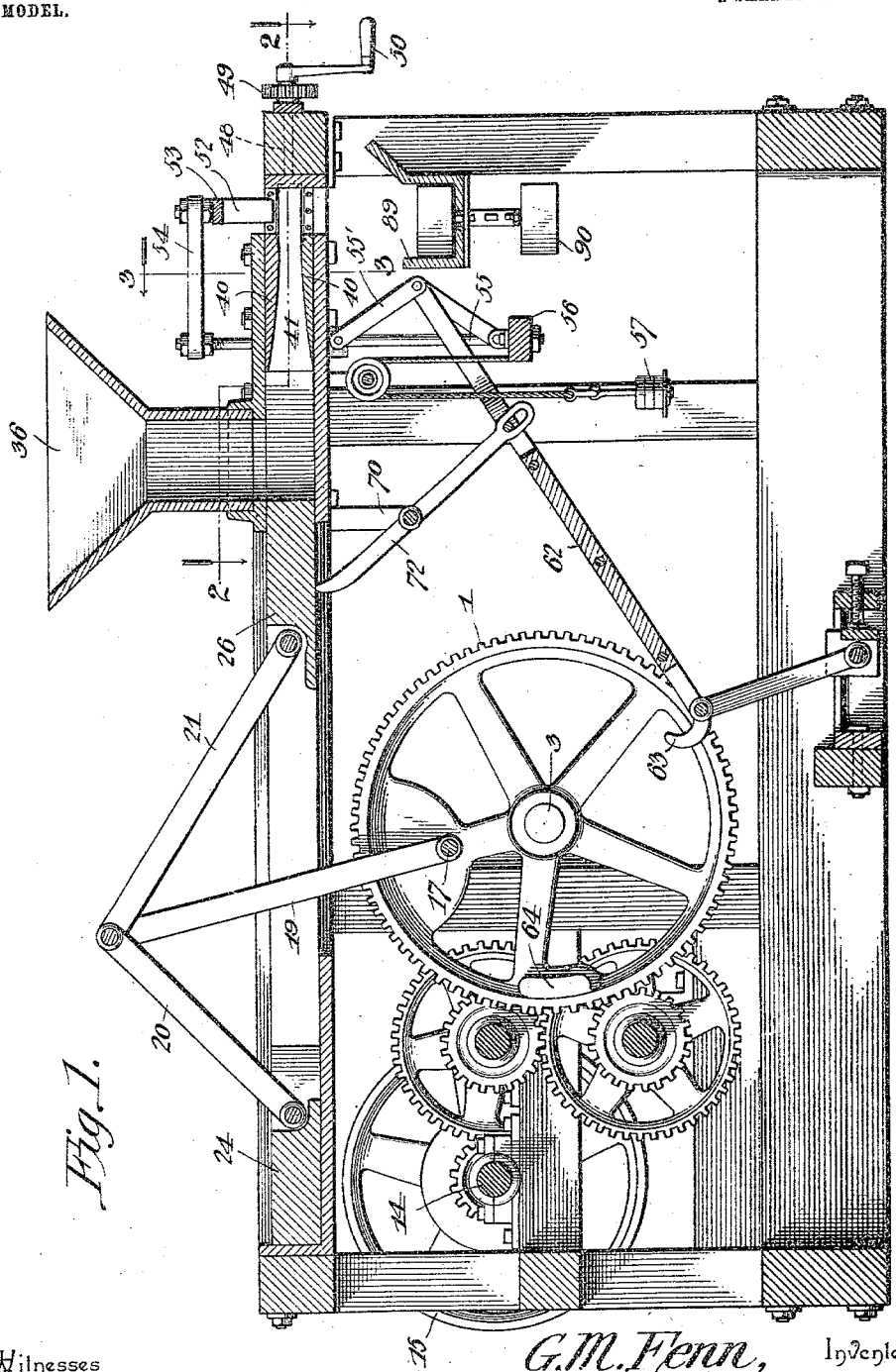

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 6.

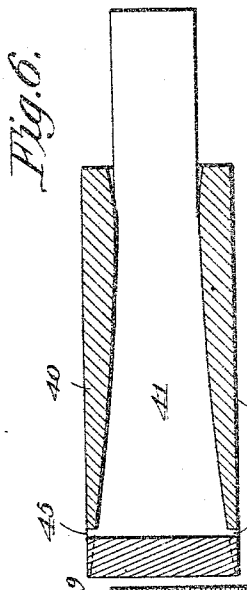


Fig. 4.

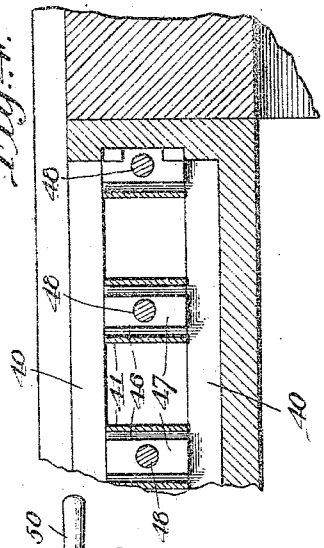
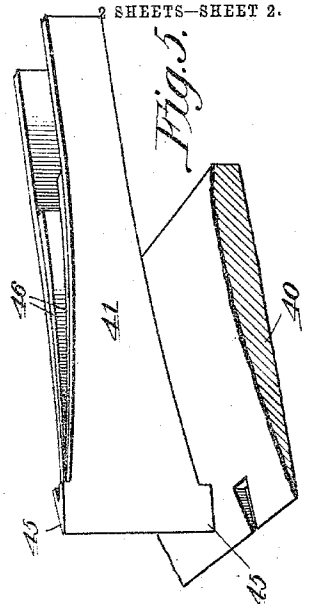


Fig. 5.



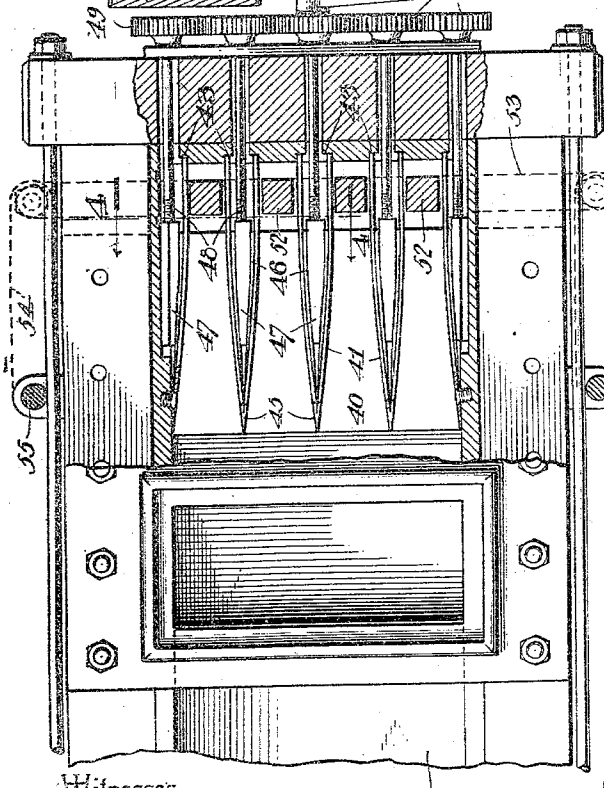
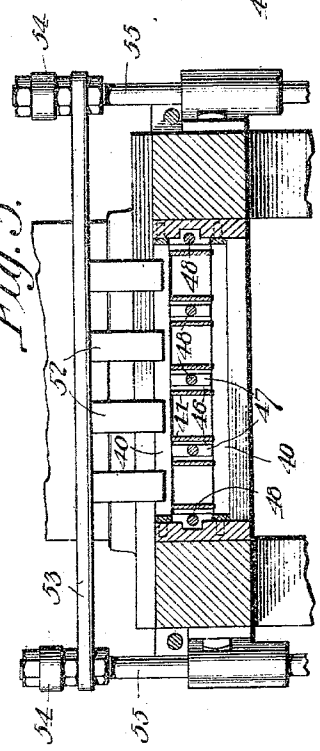


Fig. 2.

Fig. 3.



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No. 729,149. Patented May 26, 1903.

UNITED STATES PATENT OFFICE.

GEORGE MERRIHUE FENN, OF CHARLOTTE, MICHIGAN.

MACHINE FOR MAKING ARTIFICIAL-FUEL BRIQUETS.

SPECIFICATION forming part of Letters Patent No. 729,149, dated May 26, 1903.

Application filed March 23, 1903. Serial No. 150,033. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MERRIHUE FENN, a citizen of the United States, residing at Charlotte, in the county of Eaton and State of Michigan, have invented a new and useful Machine for Making Artificial-Fuel Briquets, of which the following is a specification.

This invention relates to machines for making artificial-fuel briquets.

The object of the invention is a ready, simple, rapid, and thoroughly feasible and practical manner to compress divided combustible material, such as peat, into coherent form and to present it in such shape that in burning it will not disintegrate, but will retain its form and burn from the exterior after the manner of ordinary coal and similar fuel.

A further and important object of the invention is to provide a device of this character in which the compression is effected without the employment of a rigid resisting-body, as is the case in the machine shown and described in Letters Patent No. 723,150, granted to me on March 17, 1903, the necessary resistance being afforded by forcing the divided material through a tapering compression-chamber of sufficient length to retain an appreciable quantity of compressed peat, which will afford a movable resistance to the material introduced at each operation of the compression mechanism.

A further object of the invention is to provide a device of this character in which provision is made for adjusting the area of the compression-chamber to thus alter the size of the resultant product and at the same time increase or decrease the resistance and alter to any desired extent the degree of compression of the material.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of a machine characterized by the present invention. Fig. 2 is a plan view of one end of the machine, partly in section, on the line 2 2 of Fig. 1. Fig. 3 is a transverse sectional elevation of a portion of the machine on the line 3 3 of Fig. 1. Fig. 4 is a detail sectional view, on an enlarged scale, on the line 4 4 of Fig. 2, illustrating the construction and arrangement of a portion of one of the compression devices. Fig. 5 is a detail perspective view illustrating more particularly the construction and arrangement of the mechanism for adjusting the area of the compression-chamber. Fig. 6 is a detail sectional view through the partition between two adjacent compression-chambers.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The machine forming the subject of the present invention is designed more especially as an improvement in machines of that class employed for the compression of peat, where the material being treated must be subjected to extremely high pressure in order to obtain a product which will not disintegrate when handled or exposed. The operating mechanism employed is preferably similar to that illustrated and described in the hereinbefore-mentioned Letters Patent, to which reference is made for minor details which it has not been deemed necessary to illustrate in the present application.

1 designates a gearing wheel or wheels carried by a shaft 3, adapted to suitable bearings carried by the frame of the machine. The gear is driven by a suitable train of gearing from a power-shaft 14, carrying a belt-wheel 15. On the gear-wheel is a wrist-pin 17, connected by a link 19 to a pair of levers 20 and 21, constituting the toggle-joint. The lower terminal of the lever 20 is pivoted to an abutment 24 and the similar terminal of lever 21 is pivoted to a compression-plunger 26, the latter being mounted for reciprocatory movement in a feed and compression chamber disposed below a suitable hopper 36, carried by the frame and into which the material to be compressed is fed, the plunger at each forward movement passing within the feed-chamber for a distance sufficient to cut off the supply from the hopper, and thus act

as a feed-regulator, admitting approximately the same quantity of material to be compressed immediately in advance of each compression movement. In the present case it is designed to effect compression of the material by forcing the same through a continuously-contracted compression-chamber—in other words, a tapering chamber—the inclined walls offering gradually-increasing resistance to the passage of the material forced into the chamber by the plunger and the compression being in part effected by the gradually-contracted passage, thus reducing the cross-sectional area of the block of material, and in part by the resistance offered from previously-compressed charges remaining in the contracted compression-chamber, so that on emerging from the open discharge end of said chamber the material will be compressed to the desired extent and will be in the form of blocks or briquets, each containing practically the same quantity and this quantity being regulated by the size of the feed-chamber and plunger and the extent of reciprocating movement of said plunger. The blocks will at times adhere to each other, and mechanism is therefore provided for separating them as they issue from the chamber. In the present case the feed-chamber and plunger are of sufficient size to feed four compression-chambers simultaneously, these chambers, as illustrated in the drawings, having upper and lower stationary walls 40 and opposite vertically-disposed adjustable walls 41, all of the walls being so arranged as to form in each case a rectangular chamber of gradually-contracted area from end to end. The upper and lower walls of the chamber may be formed by suitable tapering plates rigidly secured to adjacent portions of the machine-frame, while the vertical walls are formed of comparatively thin sheets of metal connected together at the feed-chamber end and forming at this point a sharp cutting edge which will readily divide the material and evenly distribute the same into the several compression-chambers. The plates 40 of two adjacent chambers gradually diverge toward the discharge end and are continued out for some distance beyond the discharge end of the chambers, formed by the upper and lower plates, their extreme outer ends being supported in a suitable groove 43 in a transversely-disposed bar on or forming part of the frame of the machine and serving to hold the plates in proper position and to some extent resisting pressure due to the movement of the material by the plunger.

In order to reduce the area of the compression-chambers, and thus alter the size of the briquets and at the same time alter the degree of compression thereof, it being presumed that the quantity fed at each operation has been unchanged, I employ suitable mechanism for separating the adjacent walls of two chambers, such mechanism being more clearly shown in Figs. 2 and 5. The plates 41, as previously described, are formed of comparatively thin metal and are not in themselves of sufficient strength to withstand the strain of pressure. In order to hold the cutting-points of the plates in proper relative position and to resist the end thrust of the plunger, the upper and lower edges of the forward ends of the plates are extended to form lugs 45, which are seated in suitable recesses in the upper and lower plates forming the top and bottom walls of the compression-chamber. Each plate is backed up by a wedge-shaped block 46, these being continued as far as possible toward the point of bifurcation of the two plates, and between these blocks is placed a longitudinally-adjustable wedge 47, which may be moved outwardly to increase the size of the chambers or inwardly to decrease their area, as will be readily understood. The wedges 46 are of sufficient thickness to resist the compression strain without making it necessary to support them throughout their entire length, although it is of course preferable that the wedge 47 should be made as long as possible in order to provide a firm backing for the said blocks. As an adjusting means for the wedges 47 I employ screws 48, the threaded ends of which fit into correspondingly-threaded openings and the rear ends of the wedges. The opposite ends of the screws are unthreaded and extend through suitable guiding-openings in one of the transverse members of the frame and are provided at their outer ends with small gears 49, which intermesh to form a continuous line of gears, one of the screws or gears being provided with a crank-operating handle 50, so that all of the screws may be turned simultaneously to affect simultaneous adjustment of the wedges and by maintaining the compression-chambers of uniform size equalize the pressure throughout the width of the machine.

As the successive briquets emerge from the discharge end of the compression-chamber they detach themselves and fall by gravity; but in some cases, especially where compression is severe, the briquets will be held together, and in order to insure a positive discharge I employ a plurality of plungers 52, adapted to make contact with the briquets and detach the same. The several plungers 52, which separate the briquets, are carried by a bar 53, connected by two arms 54 to rods 55, extending through suitable guides on the frame and connected at their lower ends to a cross-bar 56, which is movable in one direction by a counterweight 57. Movement in the opposite direction to effect depression of the plungers is accomplished by the toggle mechanism 55′, the operating-lever 62 of which is provided with a toe 63, projecting into the path of movement of a block or cam 64, projecting from the face of the gear-wheel 1. This mechanism effects downward movement of the plungers, while return movement to the position shown in Fig. 1 is accomplished

by the counterweight 57. As the toggle members move to a substantially straight position, where the counterweight is ineffective, a lever 72 is employed to break the joint of the toggles, said lever being pivoted at an intermediate point to a bracket 70, depending from the bed of the machine, one end of the lever having a slotted connection with the lever 62 and the opposite end thereof projecting into the path of movement of the rear end of the plunger, so that as the latter is on the return stroke after each compression operation the toggle-joint will be broke and the counterweight allowed to act to return the plungers to the elevated position.

In operation the hopper is supplied with the divided material, and at each movement of the plunger to the position shown in Fig. 1 the feed-chamber will be filled from said hopper, the quantity entering the feed-chamber being practically the same at each movement. The plunger is then moved forward by the toggle mechanism and forces the material from the feed-chamber into the compression-chambers, and the charge is compressed against the resistance offered by a previously-compressed charge, as well as being subjected to transverse pressure by the continuously-contracted chambers. The compressed material issues from the discharge end of the compression-chamber in the form of a continuous block, as the successive charges may adhere to each other. The plungers then descend to separate the blocks. The latter fall into a conveyer-trough 89, from which it is carried by a suitable endless conveyer, a portion of which is illustrated at 90 in Fig. 1.

Having thus described the invention, what is claimed is—

1. In a machine for compressing material into briquets, a reciprocating plunger, a plurality of compression-chambers, plates forming the side walls of said chambers, separable backing-blocks disposed between the plates, a longitudinally-adjustable wedge between said blocks, and means for adjusting the wedge.

2. In a machine for compressing material into briquets, a feed-chamber, a movable plunger disposed therein, a plurality of compression-chambers communicating with the feed-chamber, movable plates forming the side walls of the compression-chambers, said plates being connected to form cutting edges at the feed-chamber end, separable backing-blocks for said plates, and means for simultaneously adjusting said blocks.

3. In a machine for compressing material into briquets, a feed-chamber, a movable plunger disposed therein, a plurality of compression-chambers communicating with the feed-chamber, side plates forming the walls of the compression-chambers, said plates being connected to form cutting edges at the feed-chamber end, separable backing-blocks for said plates, wedges disposed between the backing-blocks and provided with threaded openings, a transverse bar having openings in alinement with the wedge-openings, adjusting-screws disposed in the several openings, gear-wheels on said screws, and an operating-crank on one of the gear-wheels, substantially as specified.

4. In a machine for compressing material into briquets, a feed-chamber, a hopper communicating therewith, a plunger, a plurality of continuously-contracted compression-chambers in communication with said feed-chamber, the side walls of said chambers being formed of plates extended beyond the discharge ends of the chambers, a transversely-disposed bar having a groove for the reception and support of the projecting ends of said plates, a plurality of plungers or blocks adapted to pass between the extended portions of the plates to separate the compressed material into briquets, and operating means for said plungers.

5. The combination with a feed-chamber and plunger, of a compression-chamber formed of a plurality of plates, and supporting means engaging the rear ends of said plates to assist in resisting the thrust of the plunger.

6. The combination with the feed-chamber and plunger, of a compression-chamber having upper and lower plates provided with alining notches, and vertical plates arranged on diverging lines between adjacent compression-chambers, the forward ends of said plates being united to form a cutting edge and being extended to points slightly above and below the edges of the plates to form recess-engaging lugs.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE MERRIHUE FENN.

Witnesses:

J. ROSS COLHOUN,

C. E. BOYLE.