

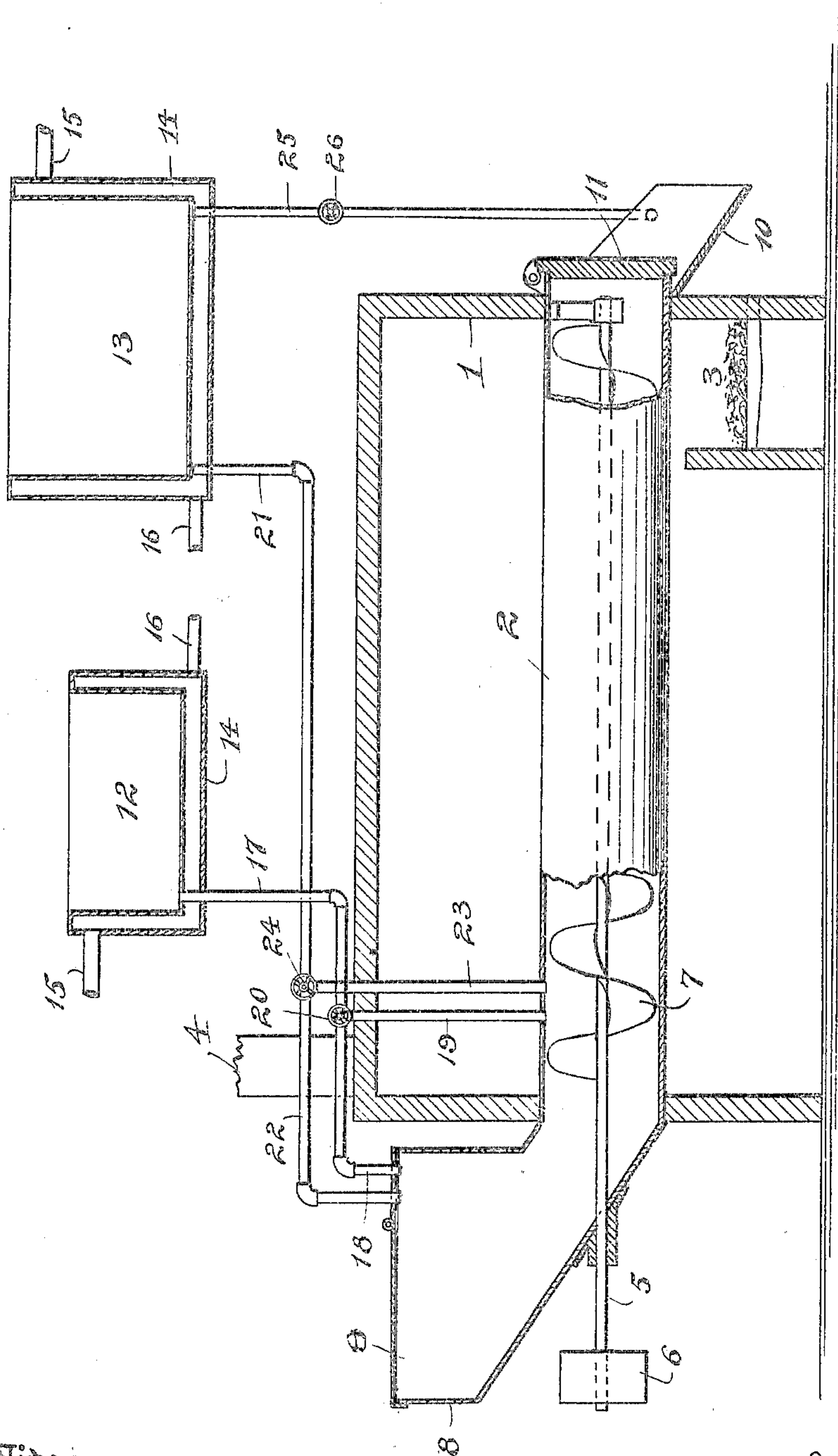
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ARTIFICIAL FUEL AND PROCESS OF MAKING SAME.

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Witnesses.

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ARTIFICIAL FUEL AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 793,771, dated July 4, 1905.

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To all whom it may concern:

Be it known that I, GEORGE M. DALLAS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Artificial Fuel and in the Process of Making the Same, of which the following is a specification.

This invention relates to improvements in a composition of matter to be used as fuel and in the process of making the same; and it consists in combining or incorporating together certain ingredients and in the novel treatment thereof, as will be hereinafter more fully set forth and specifically claimed.

The objects of the invention are to produce fuel by means of a simple process which shall be inexpensive, perfect in combustion, substantially smokeless, non-clinkering, lasting or durable, and of great heat-producing power; to utilize a cheap grade of coal or "slack," "culm," or the pulverized portion or dust from hard coal or lump soft coal, which has heretofore been wasted or unutilized, by combining it with other ingredients and by novel steps or process of treatment so as to make therefrom fuel of the above-named character which can be formed into compact cakes, briquets, or pieces convenient for handling and using and which will not disintegrate to any material extent by reason of the action of the elements thereon or in transportation.

A further object of the invention is to so prepare and treat the composition that it may be formed into hard cakes or pieces without the use of great pressure and will free itself from or will not adhere to the molds when being thus formed.

In order to enable others skilled in the art to which the invention pertains to make and use the same, I will now proceed to describe it, referring to the accompanying drawing, in which the figure represents, partly in section and partly in elevation, a convenient form of an apparatus which may be used for carrying out my process and making the fuel.

It will be understood that any suitable apparatus may be employed; but to facilitate the explanation of the process so that it may

be more easily and thoroughly understood it is deemed necessary to illustrate one form of such an apparatus.

In the drawing the reference-numeral 1 represents a furnace-casing of any suitable size, form, and material in which is located, usually in a horizontal position, a cylinder 2 to receive heat from the furnace or fire-box 3, which heat and the smoke are carried off through a flue or smoke-stack 4, located at the opposite end of the casing. Located in the cylinder 2 is a shaft 5, which is suitably journaled at each of its ends and carries a pulley 6, to which power may be applied to rotate the same. Mounted on the shaft 5 within the cylinder is a screw conveyer 7, used to convey the material from the receiving end of the cylinder to the discharging end thereof. The receiving end of the cylinder communicates with a hopper 8, which is tightly closed, and usually by means of a door 9, hinged to its upper portion. The discharging end of the cylinder communicates with a chute 10 or receptacle to receive the material after it has passed through the cylinder, and said end is closed by means of an air-tight door 11 or otherwise. Suitably mounted near the furnace-casing and above the cylinder and hopper 8, so as to feed therein by gravity, are two tanks 12 and 13, each of which is preferably provided with a steam-jacket 14 and steam-pipes 15 and 16 to be used for heating the contents of said tanks. Leading from the tank 12 is a pipe 17, which is provided with branches 18 and 19, the former communicating with the hopper 8 and the latter with the cylinder 2 near its receiving end. These branch pipes are provided at their juncture with a valve 20, used to control the flow there-through. Leading from the tank 13 is a pipe 21, which is provided with branches 22 and 23, the former of which communicates with the hopper 8 and the latter with the cylinder 2 near its receiving end. The said branch pipes are provided at their juncture with a valve 24 to be used for the same purpose as the valve 20 and above set forth. The tank 13 is also provided with a pipe 25, which communicates with the chute or receptacle 10 at

the discharging end of the cylinder and is provided with a valve 26 to shut off or regulate the flow therethrough.

The composition consists of the following ingredients combined in about the proportions stated, viz: pulverized coal—as slack, culm, or the like—twenty-five (25) tons, to which is added two hundred (200) pounds of clay; twenty-five (25) pounds of charcoal, fifty (50) pounds of lime, twenty-five (25) pounds of sulfate of zinc, twenty-five (25) pounds of salt, ten (10) pounds of borax, five (5) pounds of potash, three (3) pounds of acetic acid, one (1) peck of oil-cake meal, thirty (30) gallons of water, and enough, usually fifty (50) to one hundred (100) gallons, of paraffin residuum to make the mixture plastic. Instead of using clay I may employ gypsum or kaolin, and while I prefer to use paraffin residuum I may employ sludge acid or soap-water or any other suitable oleo-hydric compound, by which is meant a composition containing oily or fatty substances prepared with soda-ash or other flux, which will cause the same to mix perfectly.

In carrying out my process I usually mix with the pulverized coal—as slack, culm, or the like—while all in a dry state, the clay, charcoal, lime, (air-slaked,) and salt in about the proportions specified and place the said mixture in a closed receptacle—for instance, the hopper 8 of the apparatus illustrated in the drawing—where it should be tightly inclosed. The borax, potash, sulfate of zinc, acetic acid, and oil-cake meal in about the proportions specified are placed in a vessel—for instance, the tank 12—containing about thirty (30) gallons of water, which is brought to a boiling-point and boiled, and while at about said temperature this mixture is added to and thoroughly mixed with the first-named mixture, and preferably at the same time enough paraffin residuum, which is held in a tank—for instance, as in 13—and boiled for about five minutes and while at about said temperature is added to make the mixtures plastic, as above stated. When thus treated, the mixture is placed in an air-tight vessel, such as the cylinder 2, and subjected to a temperature which will raise it to the point of ignition. After having heated the mixture to the point of ignition it is discharged from the cylinder or closed vessel, and while being discharged therefrom or soon after it is again subjected to a small quantity of heated paraffin residuum or the like, after which the material may be formed into suitable cakes, briquets, or pieces by means of any suitable machine, from the molds of which it will freely pass without adhering and be in condition for handling or use. The mixture of coal, clay, lime, charcoal, and salt may have the mixture of borax, potash, sulfate of zinc, acetic acid, oil-cake meal, and water and the paraffin residuum or analogous substance

added thereto before or at the time it is being placed into the closed cylinder or vessel, and for this reason I have shown in the drawing the pipes 17 and 21, leading from the tanks 12 and 13, respectively, as each being provided with branch pipes leading to the hopper or vessel outside of the cylinder and also to the receiving end of the cylinder.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described composition of matter, consisting of pulverized coal, clay, charcoal, lime, borax, sulfate of zinc, acetic acid, salt, potash, oil-cake meal, water, and an oleo-hydric compound, substantially as described.

2. The herein-described composition of matter, consisting of pulverized coal, clay, charcoal, lime, borax, sulfate of zinc, acetic acid, salt, potash, oil-cake meal, water, and paraffin residuum, substantially as described.

3. The herein-described composition of matter, consisting of pulverized coal, twenty-five tons, clay two hundred pounds, charcoal twenty-five pounds, air-slaked lime fifty pounds, borax ten pounds, sulfate of zinc twenty-five pounds, acetic acid three pounds, salt twenty-five pounds, potash five pounds, oil-cake meal one peck, water thirty gallons, and an oleo-hydric compound fifty to one hundred gallons, substantially as described.

4. The herein-described process of making artificial fuel, consisting in incorporating with pulverized coal, lime, clay, charcoal, borax, sulfate of zinc, acetic acid, salt, potash, oil-cake meal, water and an oleo-hydric compound, in about the quantities specified, and subjecting the mixture to a temperature which will raise it to the point of ignition, substantially as described.

5. The herein-described process of making artificial fuel, consisting in incorporating with pulverized coal air-slaked lime, clay, charcoal, borax, sulfate of zinc, acetic acid, salt, potash, oil-cake meal, water, and an oleo-hydric compound, in about the quantities specified, and subjecting the mixture in an air-tight receptacle to a temperature which will raise it to the point of ignition, substantially as described.

6. The herein-described process of making artificial fuel, consisting in incorporating with pulverized coal while all are in a dry state, lime, clay, charcoal and salt; then incorporating said mixture with a mixture of borax, potash, sulfate of zinc, oil-cake meal, acetic acid, and water, while at about a boiling temperature, and also with an oleo-hydric compound while at about a boiling temperature, and subjecting the mass in an air-tight receptacle to a temperature which will raise it to the point of ignition, substantially as described.

7. The herein-described process of making artificial fuel, consisting in incorporating with pulverized coal while all are in a dry state, lime, clay, charcoal and salt; then incorporat-

ing said mixture with a mixture of borax,
potash, sulfate of zinc, oil-cake meal, acetic
acid, and water while at about a boiling temper-
ature, and also with an oleo-hydric compound
5 while at about a boiling temperature, and sub-
jecting the mass in an air-tight receptacle to a
temperature which will raise it to the point of

ignition, and then treating the mass with an
oleo-hydroacetate or saturated hydrocarbon,
substantially as described.

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