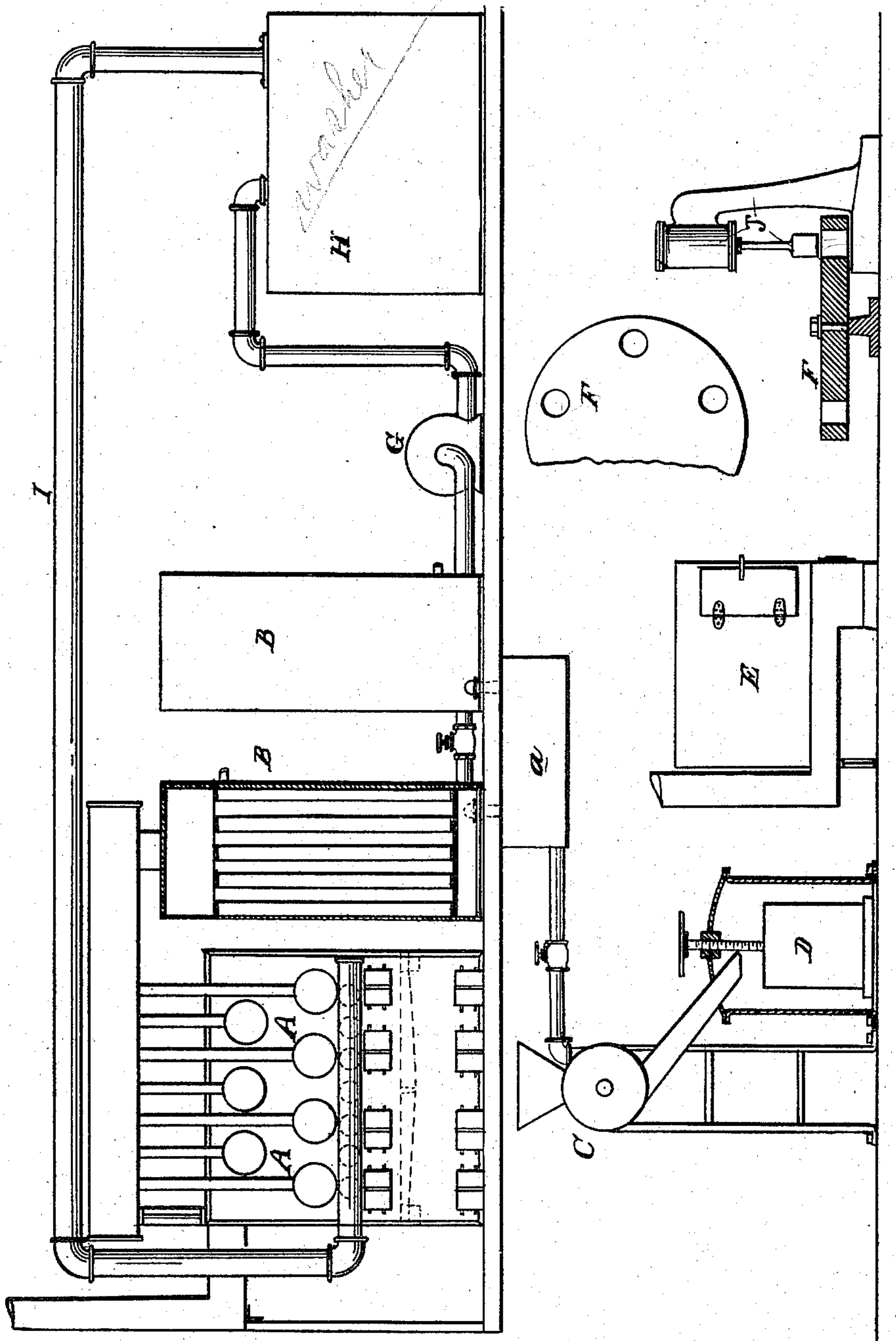


(No Model.)

F. BATTER.
PROCESS OF MANUFACTURING FUEL.

No. 580,568.

Patented Apr. 13, 1897.



Witnesses,
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UNITED STATES PATENT OFFICE.

FRANK BATTER, OF MARSHFIELD, OREGON.

PROCESS OF MANUFACTURING FUEL.

SPECIFICATION forming part of Letters Patent No. 580,568, dated April 13, 1897.

Application filed March 16, 1896. Serial No. 583,347. (No specimens.)

To all whom it may concern:

Be it known that I, FRANK BATTER, a citizen of the United States, residing at Marshfield, county of Coos, State of Oregon, have invented an Improvement in the Process of Manufacturing Fuel; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the manufacture of fuel; and it consists of the process hereinafter described and claimed.

In the accompanying drawing I have shown an apparatus by which my process can be carried out.

15 In carrying out my process I first place the coal or lignite to be treated in retorts A, such as are ordinarily employed in gas-works, or of any other suitable construction. These retorts are subjected to a low temperature which
20 is sufficient to drive off the moisture, which often amounts to fifteen or more per cent., and the volatile products, which may amount to between thirty and forty per cent., and if there is a percentage of sulfur this will also
25 be volatilized and driven off. All this volatilized material is passed through condensers B of a pattern similar to those employed in gas-works, and the tar and any oil or substance which can be condensed will be condensed at this point. Whatever gas is formed
30 passes on to a washing tank or chamber and is finally returned to be burned in the retort-furnaces. The tar sinks to the bottom and the oily products rise to the surface in the condenser, and these products are drawn off by
35 means of a tar-well *a* and by a pump or other suitable means. From the retorts the residue remaining is withdrawn and is delivered into a grinding-mill C of any suitable description,
40 which reduces this residue to a sufficiently fine powder or fine particles. The tar and oil from the condenser are then mixed with this pulverized material and the whole is delivered into a press D, which in the present case
45 is illustrated as a screw-press, where it is compacted into a solid form, and while the material is still hot as it comes from the retort and the tar-well. After being thus compacted it is removed from the press and allowed to
50 stand in mass for some time, during which the ingredients appear to become more intimately united, and any tar and oil that have been

brought to the surface by pressure are reabsorbed by the solid material. After this compound has cooled off the mass will have been
55 found to have absorbed the tar and oil, so as to form with the coked part of the coal a body having a large increase in the percentage of solid carbon and free from moisture, sulfur, &c. The mass is then placed in a furnace, 60
such as illustrated at E, and there heated in a close oven until it becomes a soft or friable mass and any remaining volatile portion is driven off. In this condition it is placed in
65 molds or dies of any suitable form, such as illustrated at F, and these dies are placed under a steam-hammer or powerful press J,
which will compress the material into ingots or blocks of convenient size for use. The
70 heating in the second furnace or oven drives off any oil or lighter product which would otherwise interfere with the permanent solidity of the blocks when burned. By this process I am enabled to utilize all the valuable
75 portion of lignites and coals carrying a low percentage of fixed carbon by first separating from the solid portion all moisture, sulfur, &c., and driving out the oily products and
80 coal-tar, the latter two being again recovered to a large extent from the condensers.

In connection with the condenser I have shown a fan or blower G, which acts to withdraw a low quality of gas and any non-condensable volatile products, and after passing
85 through another washing-chamber, (shown at H,) which serves to arrest any particles of oil or tar which may have been carried thus far, the gas will be returned from this condenser or washer and delivered into the furnaces beneath the retorts, to be used as a fuel, by means
90 of a pipe I.

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

The process of manufacturing fuel from lignites and coal containing a low percentage
95 of fixed carbon, consisting in subjecting the material to a low temperature in a closed retort to drive off the moisture and volatile products; then collecting and condensing the volatile products and allowing the gases there-
100 from to return to the retort-furnaces to be used as a fuel, after being first subjected to a washing action; then withdrawing the residue

from the retorts and reducing it to fine particles or powder and withdrawing the tar and oil resulting from the condensation of the volatile products driven from the retort and mixing them with the reduced residue from the retort; then subjecting the mass to pressure while it is in a heated condition and allowing it to cool to reabsorb the tar and oil brought to the surface by pressure; then baking the mass of compressed material to render it fri-

able and drive off any volatile portions it contains; then separating the mass into blocks or ingots, in molds, and subjecting it to pressure to form permanent blocks.

In witness whereof I have hereunto set my hand.

FRANK BATTER.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.