

No. 767,158.

PATENTED AUG. 9, 1904.

A. LEYER.

DRIER.

APPLICATION FILED FEB. 1, 1904.

NO MODEL.

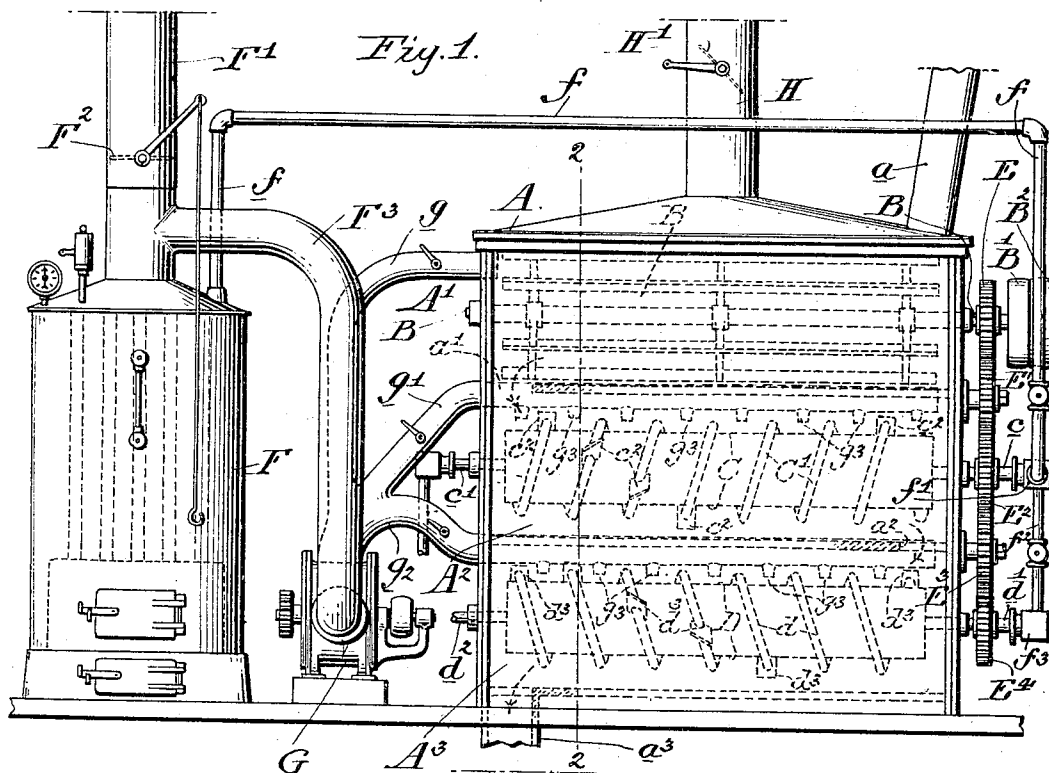
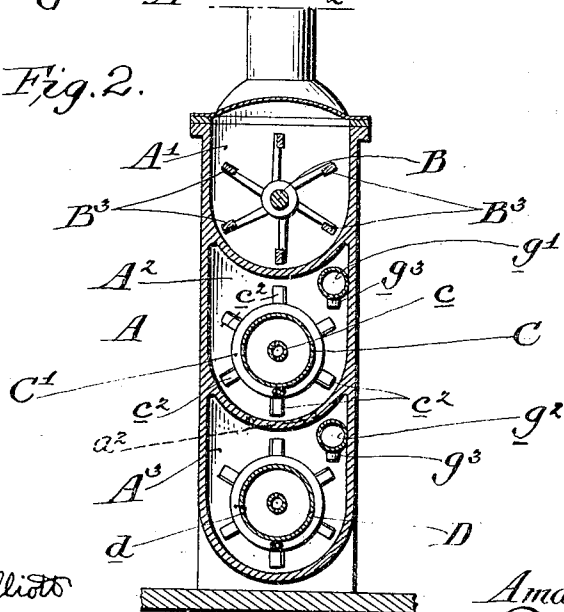


Fig. 2.



WITNESSES:

Norman W. Elliott
Jas. Brown.

INVENTOR

Amand Leyer
BY
Rand S. Williams
ATTORNEY.

UNITED STATES PATENT OFFICE.

AMAND LEYER, OF PHILADELPHIA, PENNSYLVANIA.

DRIER.

SPECIFICATION forming part of Letters Patent No. 767,158, dated August 9, 1904.

Application filed February 1, 1904. Serial No. 191,419. (No model.)

To all whom it may concern:

Be it known that I, AMAND LEYER, a subject of the Emperor of Germany, (but having declared my intention of becoming a citizen of the United States,) residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Driers, of which the following is a specification.

My invention relates to improvements in driers for treating waste brewers' grains which have been previously used in the manufacture of alcoholic liquors, the general plan of which consists in the employment of suitably-constructed agitating devices for separating the mass, together with steam and hot-air heating appliance to thoroughly dry the grain as it is being conveyed through the several compartments of the drying-chamber.

My invention will be more fully understood by reference to the accompanying page of drawings, in which—

Figure 1 illustrates a side elevation of my drier, together with the heating appliances I desire to employ for the purpose of drying the grain; and Fig. 2 is a vertical section of the drier, taken on a line 2 2 of Fig. 1.

Referring to the reference-letters indicated throughout the drawings, A represents the drying-chamber, which in the present instance is divided into three communicating compartments A', A², and A³, the first compartment A' of which is provided at one end with an inlet-chute *a* and at the opposite end with a discharge-opening *a'*, leading into the compartment A². This compartment is in like manner provided with an oppositely-disposed discharge-opening *a''*, leading into the compartment A³, which has a discharge-chute *a'''* leading to any suitable receptacle placed to receive the finished product. The compartment A' is provided with a central shaft B, controlled in its rotation by means of fast and loose pulleys B' and B² and having agitators or paddles B³ to agitate the grain. The compartment A² is provided with a steam-drum C, surrounded by a steam-coil C', the former being supplied from a steam-inlet connection *c* and a discharge connection *c'*, while the latter is at its opposite ends in open communica-

tion with the steam-drum. The drum C is also provided with a number of inclined blades *c''*, which in conjunction with the coil tend to feed the grain toward the opening *a''*.

In the compartment A³ is contained a steam-drum D, in all respects like that of the compartment A², having a steam-coil *d* surrounding it and in open communication therewith, the drum being supplied by a steam connection *d'* and having a discharge connection *d''*. This drum is also provided with paddles, which are marked *d'''*, which, together with the coil, tend to feed the material contained in the compartment toward the discharge-chute *a'''*.

The drums C and D are caused to rotate by means of a train of gearing operated from the shaft B, said shaft being provided with a gear E, meshing with an idler E', from which power is transmitted to a gear E² on the connection *c* and from thence to an idler E³, which drives a gear E⁴, mounted on the connection *d'*.

Steam is supplied to the drums C and D from a boiler or steam-generator F through a pipe *f*, which connects with a stuffing-box *f'* on the connection *c*, and from thence by a branch *f''* to a stuffing-box *f'''*, mounted upon the connection *d'*. In addition to the use of the steam-heating appliances just described my invention contemplates the introduction of hot air to the grain as it is being fed through the drier, and in this connection I prefer to utilize the products of combustion from the furnace of the boiler F after the fire has attained a high degree of incandescence.

The boiler F is provided with the conventional stack F', in which I place a damper F² and below the damper a branch pipe F³, leading to a rotary pump G.

From the pump G a number of branches *g*, *g'*, and *g''* lead to the compartments of the drier, the first communicating directly with the compartment A' and the remaining branches extending into the respective compartments A² and A³ and having downwardly-projecting nozzles *g'''*, supplying heated air and gases to the grain as it is being agitated. The heated air and gases discharged through the nozzle *g'''* pass through the several compartments of the drier and out through a stack H, the dis-

charge from which may be regulated by a damper H'.

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

1. A drier comprising a receptacle to receive waste brewers' grains, divided into a number of compartments, a steam-generator located in close proximity to said drier, a pipe leading from the furnace of said steam-generator to the compartments of the drier, a pump in line of connection with said pipe, agitating devices in each of the compartments of said drier and a steam connection from the generator to the drier to heat one or more of the agitators, substantially as specified.

2. A drier comprising a receptacle divided into a series of communicating compartments, a steam and hot-air generator, a pipe leading from the furnace of the generator to the drier, means for forcing heated air and gases through

said pipe, agitating devices in each of the compartments and a pipe leading from the boiler of the generator to the agitators, substantially as described.

3. A drier comprising a receptacle divided into a series of superposed communicating compartments, agitating devices located in each of said compartments, means for operating the same, a generator located in close proximity to the drier, a line of pipe interposed between the boiler of the generator and the agitating devices, a line of pipe interposed between the furnace of the generator and each of the compartments of the drier, and a pump in line with said pipe, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

AMAND LEYER.

Witnesses:

DAVID S. WILLIAMS,
ARNOLD KATZ.