No. 886,887.

C. D. STEPHENS. PATENTED MAY 5, 1908.

APPARATUS FOR TREATING GRAIN.

APPLICATION FILED APR. 29, 1907.

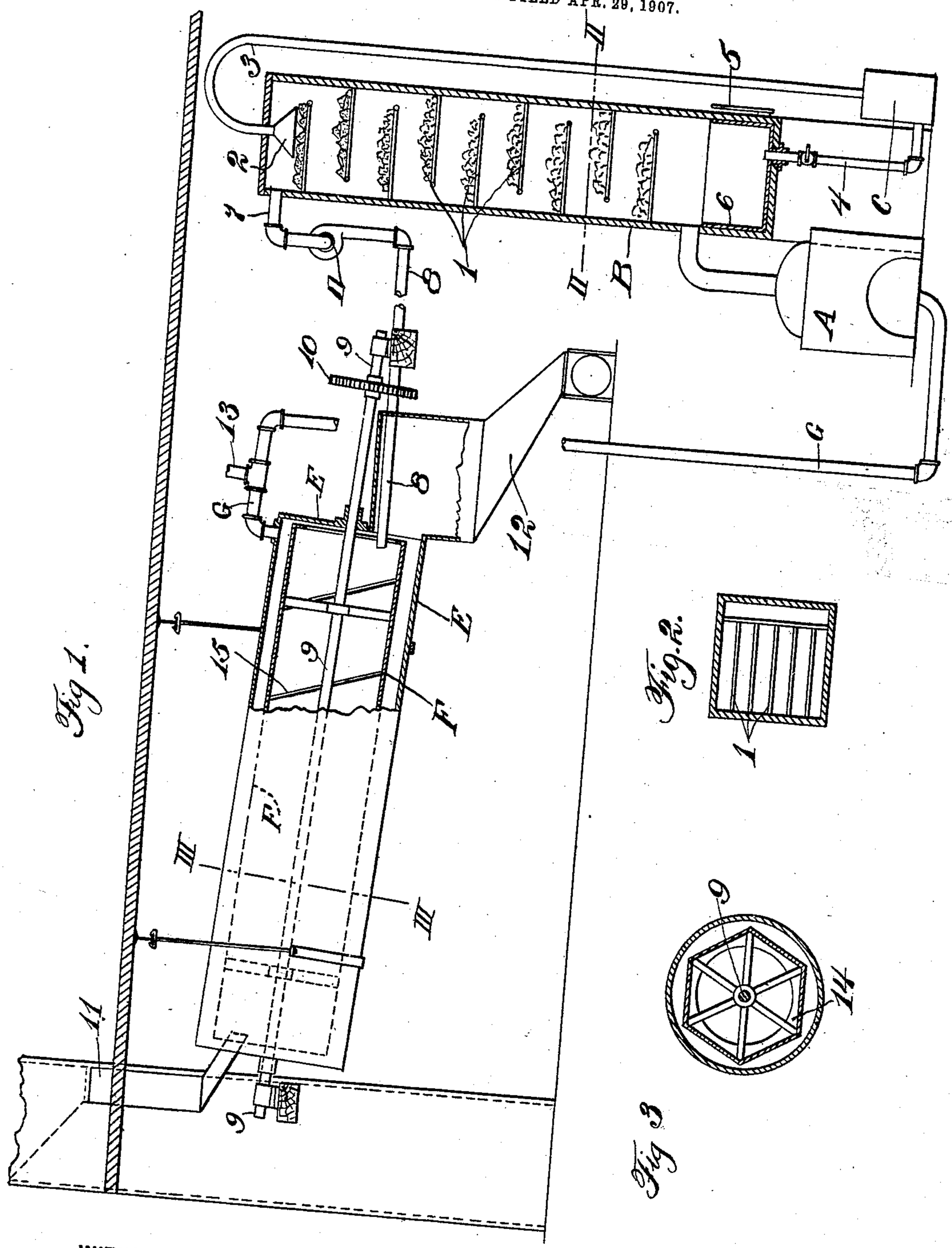

Fig 1.

Fig. 2.

Fig 3

WITNESSES

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APPARATUS FOR TREATING GRAIN.

No. 886,887. Specification of Letters Patent. Patented May 5, 1908.

Application filed April 29, 1907. Serial No. 370,946.

To all whom it may concern:

Be it known that I, CLAUDE D. STEPHENS, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented a new and useful Improvement in an Apparatus for Treating Grain, of which the following is the specification.

My invention relates to the apparatus for treating and thereby improving the quality and appearance of grain by means of purifying and bleaching fumes. The invention has for its objects; to provide an improved apparatus which can be operated continuously and at a minimum expense, and to provide an apparatus adapted to carry on a cold process whereby danger of super heating the grain and the resultant fermentation is avoided. These and other objects which will be apparent to those skilled in the art, are accomplished by my invention, one form of which is illustrated in the accompanying drawings, in which

Figure 1 is a side elevation of the assembled apparatus with certain of the parts in section to more clearly disclose the interior of such parts,

Figure 2 is a transverse section through the mixer of Figure 1 on the line II—II, and Figure 3 is a transverse section on the line III—III of Fig. 1.

In my apparatus, as in other prior apparatuses of this general type, provision is made for the treatment of grain with fumes comprising a mixture of sulfur dioxid and water vapor, which fumes are secured by passing the fumes from a sulfur furnace through a mixer for supplying water to the dioxid fumes. As is well known in the art this treatment whitens the grain and renders it palatable. My invention has to do with the improved apparatus for carrying out the foregoing process in the most economical and desirable manner.

Referring first briefly to the general arrangement as shown in Figure 1, A is the sulfur furnace which may be of any improved type for burning sulfur and collecting the fumes therefrom, B is the device for mixing the sulfur dioxid fumes with water vapor and for lack of a better term will be referred to as a mixer, C is a pump for drawing water from the bottom of the mixer and returning it at the top, D is a circulating fan for carrying the sulfur dioxid fumes and water vapor from the mixer to the treatment bin E, to which the grain is introduced, F is a hollow rotatable reel or agitator for promoting the circulation of the fumes through the grain and G is a pipe for returning a portion of the fumes from the treatment bin to the furnace. Referring now more particularly to the construction of the various parts, the mixer B, in order to secure a large dampening surface, is provided with a plurality of oppositely projecting skeleton shelves 1 which shelves are of the shape indicated in Figure 2 and carry a layer of porous material such as coke or charcoal for absorbing and holding moisture. By the arrangement indicated the sulfur dioxid fumes are caused to pass through or around a large number of layers, thereby securing a proper accompaniment of water vapor for promoting a vigorous action of the bleaching fumes upon the grain.

In order to supply the moisture necessary a sprinkler 2 is provided, which sprinkler 2 is connected by means of pipe 3 with the pump C. The pump C is supplied with water by means of pipe 4 which extends into the bottom of the mixer so that the water which filters down through the mixer can be used again. The pipe 4 is projected into the mixer and a gage glass 5 is provided for indicating the height of such liquid. The lower part of the mixer is provided with a lead lining 6 necessitated because of the acidity of the water due to the absorption thereby of sulfur dioxid, which acidity it will be seen increases as the use of the water is repeated, so that finally sulfurous acid of considerable strength is secured. The liquid attains a high temperature after repeated use which condition accelerates the action of the apparatus. The fan D may be of any desired type and is connected with the mixer at one side by means of the pipe 7, and at the other side is connected to the treatment bin E by means of pipe 8, which pipe 8 passes through the casing of the treatment bin and has its end extended into the agitator F. The agitator is mounted upon a shaft 9 which shaft carries at its end a sprocket pulley 10, whereby the agitator may be rotated from a source of power. The agitator is inclined and hollow, and as indicated in Figure 3, has six sides. The grain is preferably introduced into the side of the agitator through a chute 11 and is discharged therefrom after mixture with the bleaching fumes, through the chute 12 after having passed slowly through the inclined agitator. The fumes

pass out of the treatment tank through the pipe G, and a part of such fumes is returned to the furnace A, while another portion of the fumes is discharged to the air by means of pipe 13. The ends of the agitator are open but are provided with a narrow ledge or annulus 14 as shown in Fig. 3, to prevent the grain from flowing too freely through the agitator. Inclined cleats 15 may also be secured to the interior of the agitator to facilitate the longitudinal movement of the grain.

It will be apparent from the foregoing that the apparatus is an economical and convenient one for the reason that not only are the fumes reused and utilized to the fullest extent, but similarly the water for moistening the fumes is reused thereby avoiding any loss incident to the absorption of the sulfur dioxid by the water. Furthermore by using the oppositely projecting shelves in the mixer, a thorough mixture is secured without unduly interfering with the circulation in the system, as is the case when the fumes are forced through a body of water. It will also be seen that no heating occurs in the system, which heating as used in other systems tends to ferment and injure the grain. It will also be apparent that a thorough exposure of the grain to the fumes is secured by the use of the annular sided agitator, which thoroughly agitates the grain and gradually advances it through the treatment bin.

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

1. In an apparatus of the character described, a furnace, a mixer connected thereto, means for supplying moisture to the mixer, a treatment bin, means for conducting the fumes from the mixer to the bin, and means for conducting the fumes from the bin back to the furnace.

2. In an apparatus of the character described, a sulfur furnace, a mixer connected thereto, means for supplying moisture to the mixer, a treatment bin, an agitator therefor, means for conducting the fumes from the mixer to the bin, and means for conducting the fumes from the bin back to the furnace.

3. In an apparatus of the character described, a mixer comprising a casing having an opening at its bottom for the introduction of sulfur dioxid fumes and at its top an opening for their withdrawal, a plurality of substantially horizontal shelves secured one above the other alternately to opposite sides of the casing and free at their outer ends whereby a zig zag passage about the shelves is secured, and means for introducing water at the top of the casing.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

CLAUDE D. STEPHENS.

Witnesses:

PAUL CARPENTER,

JAMES NICHOLAS LORENZ.