No. 812,110. PATENTED FEB. 6, 1906.

R. I. AGNER.

FLOUR BLEACHER AND PURIFIER.

APPLICATION FILED MAR. 25, 1905.

2 SHEETS—SHEET 1.

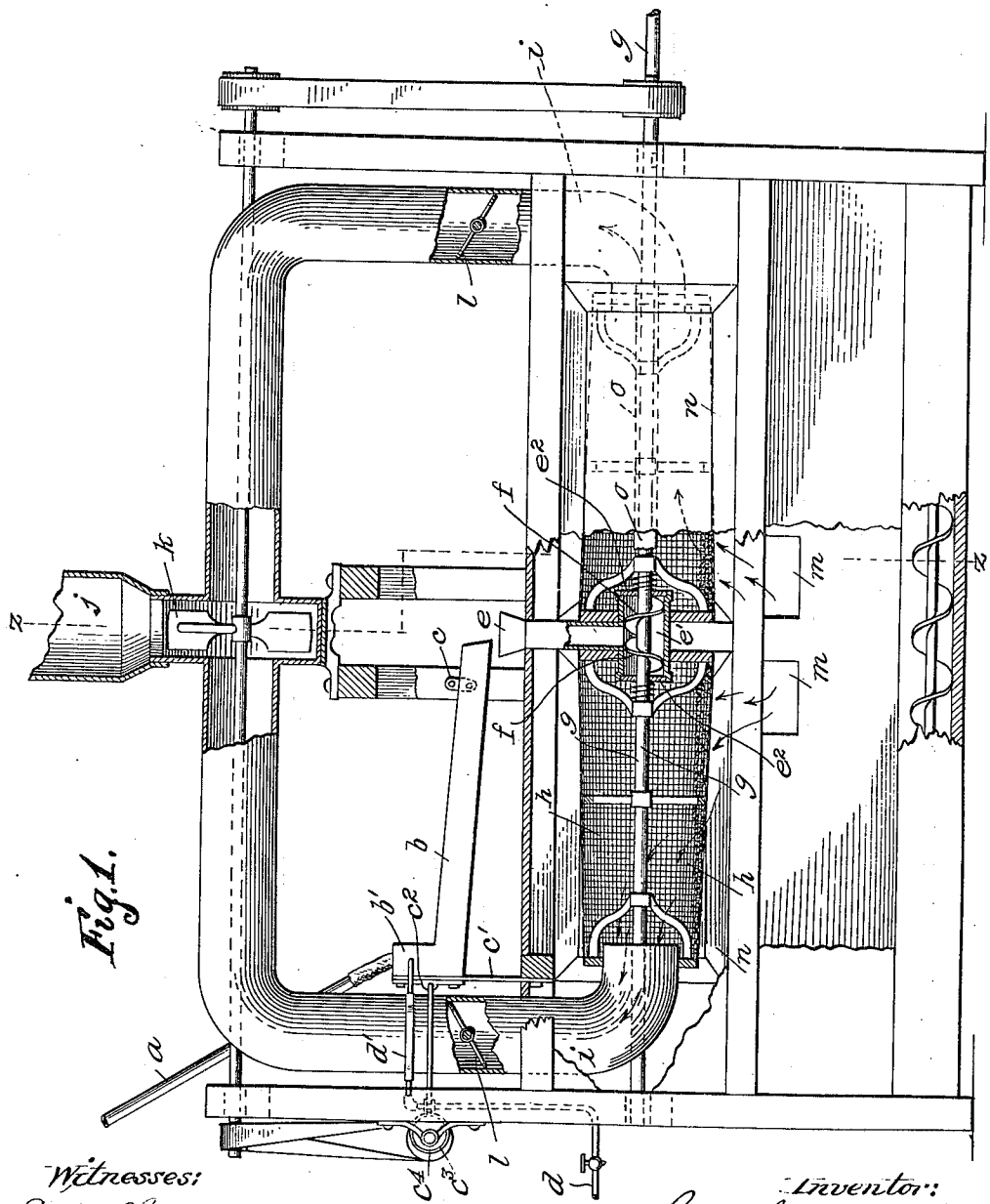

Fig. 1.

Witnesses:
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2 SHEETS—SHEET 2.

Fig. 4.

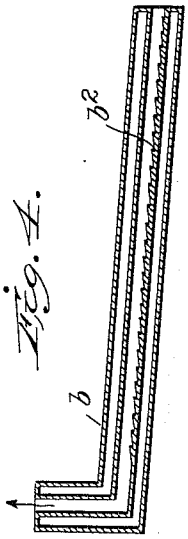

Fig. 1.

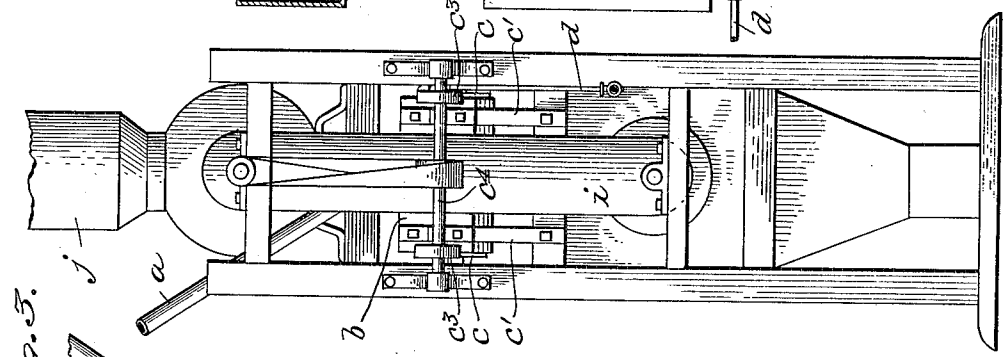

Fig. 3.

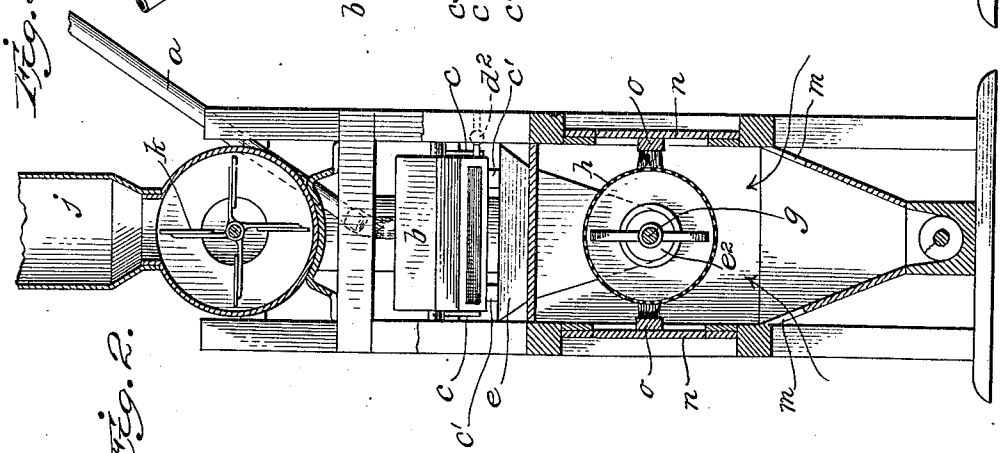

Fig. 2.

Witnesses

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UNITED STATES PATENT OFFICE.

ROBERT I. AGNER, OF SALEM, VIRGINIA.

FLOUR BLEACHER AND PURIFIER.

No. 812,110. Specification of Letters Patent. Patented Feb. 6, 1906.

Application filed March 26, 1905. Serial No. 252,040.

To all whom it may concern:

Be it known that I, ROBERT IRVIN AGNER, a citizen of the United States of America, and a resident of Salem, county of Roanoke, State of Virginia, have invented certain new and useful Improvements in Flour Bleachers and Purifiers, of which the following is a full and clear specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side view, partly in vertical section, of my improved apparatus. Fig. 2 is a vertical section taken on the line 2 2 of Fig. 1. Fig. 3 is an end elevation, and Figs. 4 and 5 are detail views, of the heater.

The object of this invention is to provide a simple apparatus for efficiently bleaching and purifying flour by first subjecting it to a sufficiently high degree of heat in a steam-jacketed chamber to drive out sufficient moisture to make it flaky and also destroy larvæ and bacteria and then to the simultaneous action of bolting-reels and a properly-regulated air suction or current to remove not only the moisture and odors liberated by the heat, but also the impurities which by the action of the heat have been rendered lighter than the flour, as more fully hereinafter set forth.

To the accomplishment of this object and such others as may hereinafter appear, the invention consists of the parts and combination of parts hereinafter fully described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, in which the same reference characters designate like parts throughout the several views.

Referring to the drawings by letters, *a* designates the spout through which the flour is fed to the apparatus. This spout empties into the open upturned outer end *b'* of the heater *b*, which consists of a jacketed flat metal case having its bottom transversely corrugated at b^2. The steam-jacket extends all around the casing and is supplied with steam by a pipe *d*, having a flexible section *d'* inserted in it at a suitable point. The heater inclines downward and inward and is supported at its inner end by links *c* and at its outer end by spring-supports *c'*. It is vibrated by means of a pitman c^2 and an eccentric c^3, mounted on a shaft c^4 at the end of the frame, this shaft c^4 being driven by suitable shafting and belting. A drain-pipe d^2 is attached to the inner lower end of the steam-jacket of the heater.

The inner open end of the heater terminates over a centrally-arranged chute *e*, which passes down through the top of the closed casing and terminates in a horizontal open-ended tube *e'*, whose ends are normally closed by spring-actuated disk valves e^2. A shaft *g* extends through the two valves and the tube *e'* and has mounted on it a pair of reversely-turned conveyer-screws *f*, which serve to divide the incoming stream of flour equally and feed it in opposite directions out past the spring-valves, these valves opening sufficient to permit the flour to pass out of the tube in opposite directions.

Mounted on a shaft *g* is a pair of bolting-reels *h* of substantially the same size and each tapering from its inner end outward. The reels are closed at their ends by solid walls, and the inner ends turn on the respective ends of the stationary tube *e'*.

The respective branches *i* of the exhaust conduit or pipe *j* pass down through the top of the casing and are turned horizontally inward to enter the end walls of the respective reels, and in each branch is a regulating-valve *l*. The exhaust-fan is mounted on a suitable shaft at the juncture of the branches *i* with the main exhaust-tube *j*. The fan-shaft, the shaft c^4, and the shaft *g* are driven by suitable belting. At or near the center of the casing at a suitable point below the reels air-inlet openings *m* are provided.

At opposite sides of each reel is mounted a brush *o*, which extends approximately the full length of the reel and serves not only to clear the meshes of the bolting-cloth, but also to direct the air-current up through the under sides of the reel. Each of these brushes is mounted for convenience of examination and repair upon a removable panel set in the side of the casing.

It will be observed that by means of the fan and the valves *l* a nicely-regulated current of air may be drawn up through the reels, and by locating the inlet-openings midway the ends of the casing the currents are caused to travel substantially the full length of the reel in opposite directions. The reels being larger at their inner ends, the stock will tend to accumulate at these ends and will spread out to a thin layer toward the outer smaller ends of the reels, thereby subjecting all the flour to the action of the air-currents and insuring the removal of the lighter impurities.

The vibration of the heater *b* feeds the

flour to the spout *e*, and this feeding action is augmented by the corrugations in the bottom of the heater, these corrugations being step-like in form, with the straight faces of the steps facing the exhaust end of the heater. As the flour passes down through the heater it will be spread in a thin sheet over the corrugated bottom and will thereby be subjected to a uniform heat.

By employing steam burning of the flour is avoided while passing through the heater, and it will be observed that if the copper-bottomed heater be kept at a suitable temperature while the flour is passing over it in a thin sheet moisture will be driven off and germs be destroyed. Thus reducing the flour to a dry or flaky state enables the impurities, especially the dead and dried germs, which have been rendered lighter than the flour, to be readily bolted and then drawn out by a gentle air-current of insufficient strength to carry off any of the flour. The moisture remaining in the flour, as well as offensive odors, are also drawn out, and, furthermore, this treatment will obviously tend to bring out the natural whiteness of the flour by the removal of those impurities which, if left in the flour, tend to darken it. I find that flour thus treated is not only rendered whiter and more flaky, but that it will keep sweet and pure indefinitely.

It will be apparent to those skilled in the art that various mechanical embodiments of the invention are possible, and I therefore do not wish to be limited to the exact arrangement and construction shown.

What I claim, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described, the combination of means for drying out and feeding the flour, and means for removing the lighter impurities, consisting of a casing closed except for the provision of air-inlets at its opposite sides about midway its length, a shaft running longitudinally through the casing, and carrying a pair of bolting-reels having their inner ends closed and located near each other, said reels each tapering toward its outer end, a chute adapted to receive the flour from the feeder and extending down between the inner ends of the reels, a horizontal open-ended tube communicating with said chute and having its ends extending into the adjacent inner ends of the reels, spring-actuated valves for the ends of this tube, reversely-curved screw-blades on the aforesaid shaft within said tube, exhaust-pipes extending out from the outer ends of the respective reels, and provided with valves and means for creating a suction through these exhaust-pipes for the purpose set forth.

2. In an apparatus of the class described, the combination of means for feeding the flour and means for subjecting the flour to the action of a current of air to remove the lighter impurities this latter means consisting of a casing closed except for the provision of air-inlets at opposite sides below the reels hereinafter mentioned, a shaft running longitudinally through the casing and carrying a pair of bolting-reels arranged end to end on the shaft, a chute adapted to receive the flour from the feeder and extending down between the inner ends of the reels, a horizontal open-ended tube communicating with said chute and having its ends extending into the adjacent inner ends of the reels, valves normally closing the ends of this tube, means on the shaft within the tube for oppositely feeding the flour past said valves simultaneously, exhaust-pipes extending out from the outer ends of the respective reels, and means for creating a draft up through the reels and the exhaust-pipes.

3. In an apparatus of the class described, the combination of a casing, a shaft extending longitudinally through the casing and carrying a pair of reels arranged end to end on the shaft, means for rotating the shaft and its reels, means for conducting flour down through the top of the casing and feeding it into both inner ends of the reels simultaneously, exhaust-pipes connecting the respective tail ends of the reels, means for creating a regulated suction through these pipes, said casing being closed all round except for the provision of inlet-openings below the reels, and a pair of brushes mounted upon opposite sides of the casing above the inlet-openings and engaging the opposite sides of the reels, these brushes serving not only to clean the meshes of the reels but also as partitions to direct the air-draft upward through the reels.

4. In an apparatus of the class described, the combination of a casing, a shaft extending longitudinally through the casing and carrying a pair of reels arranged end to end on the shaft, means for rotating the shaft and its reels, means for conducting flour down through the top of the casing and feeding it in through the center of both inner ends of the reels simultaneously, exhaust-pipes connecting to the respective tail ends of the reels, means for creating a regulated suction through these pipes, said casing being closed all round except for the provision of inlet-openings below the reels.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 14th day of March, 1905.

R. I. AGNER.

Witnesses:
S. B. JOHNSTON,
S. D. TALIAFERRO.