

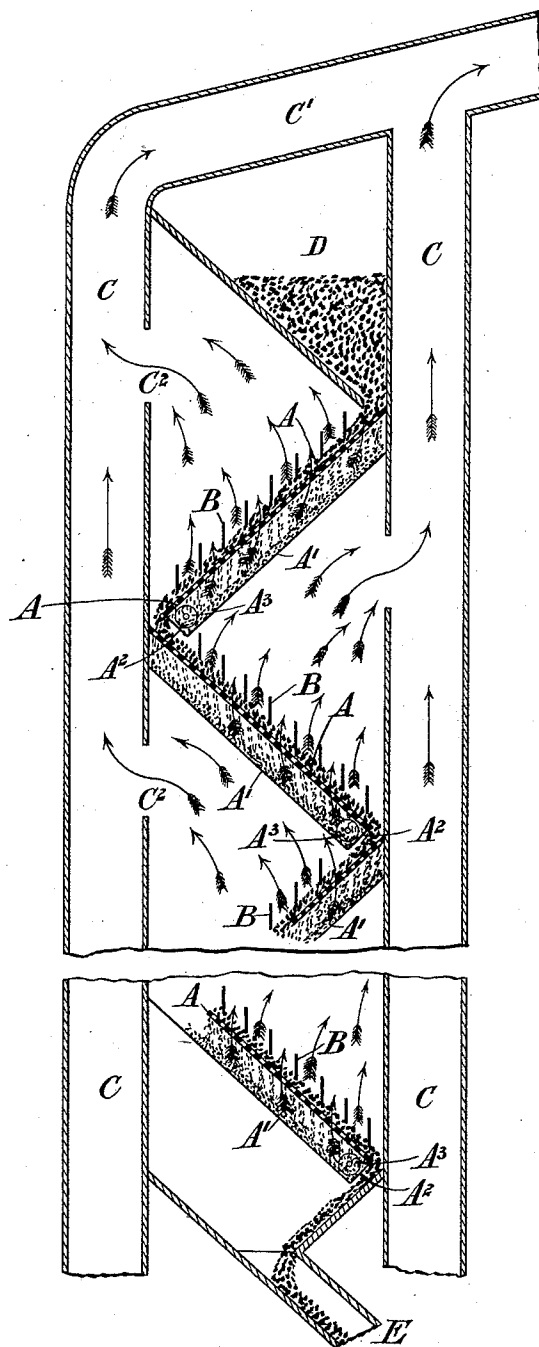
(No Model.)

T. & G. M. PARKINSON.

APPARATUS FOR DRYING, HEATING, COOLING, OR PURIFYING GRAIN.

No. 417,273.

Patented Dec. 17, 1889.



Witnesses:

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UNITED STATES PATENT OFFICE.

TOM PARKINSON AND GEORGE MARSDEN PARKINSON, OF DONCASTER,
ENGLAND.

APPARATUS FOR DRYING, HEATING, COOLING, OR PURIFYING GRAIN.

SPECIFICATION forming part of Letters Patent No. 417,273, dated December 17, 1889.

Application filed July 23, 1889. Serial No. 318,462. (No model.) Patented in England September 22, 1888, No. 13,714.

To all whom it may concern:

Be it known that we, TOM PARKINSON and GEORGE MARSDEN PARKINSON, both subjects of the Queen of England, and residing at Doncaster, in England, have invented certain new and useful Improvements in Apparatus for Drying, Heating, Cooling, or Purifying Grain or other Substances, (for which we have applied for Letters Patent of Great Britain, No. 13,714, dated September 22, 1888,) of which the following is a specification.

This invention relates to apparatus for cooling, drying, heating, cleaning, sweetening, purifying, and separating grain or any products therefrom in any stage of reduction or manufacture and other substances, and is an improvement upon British patent No. 10,775 of 1884, granted to G. M. Parkinson and J. G. Walker. These results are attained by means of hot or cold air either drawn or blown through the material to be acted upon while it is traveling by mere force of gravity down inclined perforated plates or trays, the sieving or separating taking place at the same time, if desired. The plates may be formed of galvanized wire or perforated iron or other suitable material, and are inclined one above the other in zigzag form. Each plate is provided on its upper surface with any suitable number of adjustable louvers or valves which regulate the thickness of the stream of descending grain. The thickness of the stream may obviously be varied, but we have found a layer of one-fourth to three-fourths of an inch to give good results. A hopper is placed at the top of the machine, into which the grain is fed, and the whole of the grain is acted upon by the cooling or heating medium during the entire time of its passage through the machine. The grain is turned over on its passage from one plate to the plate next below it (thus obviating the necessity for turning the grain over by hand) until it reaches the bottom, where a valve or other suitable opening regulates the rate of discharge.

When the apparatus is required to be used as a cooler and drier, the casing of the apparatus may be formed of wood or other suitable material, and external air may be drawn by a fan through openings in the sides of the

receptacle, which air passes through the inclined perforated plates and the grain lying thereon and finally escapes through openings formed in the casing of the receptacle leading to the exhaust. Instead of employing a fan, the cold blast may, if desired, be blown through the receptacle by any suitable means. When, on the other hand, the apparatus is to be employed as a heater and drier, it is preferable to form the receptacle of fire-clay and iron, and a trunk or shaft from a coke-furnace or other source of heat is carried up and heated air from it is drawn into the receptacle through perforations provided for the purpose, the hot air finally passing off to the exhaust in substantially the same manner as described above with reference to cold air. In this case, also, a blast can be employed instead of an exhaust, if desired.

The size of the trays or inclined planes may obviously vary considerably, according to the different purposes for which the machine is to be used and to the amount of work required to be done; but we have found two to four feet wide and one to two feet long to be a convenient size.

It will be obvious that we do not confine ourselves to the exact form of apparatus described, but that deviations may be made without departing from the spirit of our invention.

The accompanying drawing is a vertical section of portion of the apparatus constructed according to our invention, sufficient to illustrate the manner of carrying the said invention into practice.

A are inclined plates or trays formed of perforated metal or woven wire, preferably galvanized, or of other suitable material. These plates are supported in any convenient manner within a suitable frame at such an angle that the grain or other substance to be treated in the apparatus by mere force of gravity will fall over the upper surfaces of such plates, and the direction of inclination of each of the plates being opposite to that of the plate immediately above or below it the grain will be caused to descend through the apparatus in a zigzag manner.

B are louvers, valves, or strickling-bars, 100

which preferably are so mounted in the apparatus as to be capable of being adjusted nearer to or farther from the plates A, so as to reduce or increase the thickness of the stream of grain passing over the plates.

A' are solid or unperforated plates, one of which is below and parallel to each of the plates A, the lower edges of the plates A and A' being joined by another unperforated plate A². Within and at the lower part of each of the hollow inclined shelves thus formed is provided a worm or screw-creeper A³, the shaft of which projects through the wall or walls of the apparatus, so that it may be rotated in any convenient manner.

If the apparatus is to be used for cooling grain or other substances, the hollow shelves have each an opening through which atmospheric air may have free access. If the apparatus is to be used for heating the substances, then to each of the said hollow shelves is connected a pipe or the like for introducing into such shelf the medium to be employed for such heating purposes.

C are trunks or shafts, which are connected to each other by the pipe C', by which the said shafts are also placed in communication with an exhaust-fan or other suitable exhauster; or, in place of being connected with an exhauster, the apparatus may be connected to a fan or other means for forcing a blast of heating or cooling air through it.

C² are openings in the said shafts, through which may be drawn or forced the vapors arising from the substance under treatment and any light particles of the substance under treatment it may be desirable to separate from the bulk in this way.

When an exhauster is to be used as above described, it must be located at any convenient portion of the device—as, for instance, at the upper end of the shafts C—in order to draw the air from one end or portion to and out at another portion; and when the blower is used it may also be located at any convenient portion, as at the lower portion, in order to force the air into it at one point and then through the interior and out at another place. As these means of introducing and exhausting the air from the drier form no part of our invention, and their construction and operation are so well known, we have not shown them in the drawing.

D is the hopper into which is charged the grain or other substance to be treated in the apparatus, and E is the chute by which the said substance, after having been treated, is discharged into any suitable receptacle, this chute or other chutes branching from it being preferably provided with a valve or valves by means of which may be regulated the rate of discharge and consequent rate of descent of the substance from and through the apparatus.

In "conditioning" grain or any products therefrom in the before-described apparatus it is subjected to treatment which may either

heat or cool it, and will simultaneously with such heating or cooling also dry, clean, sweeten, purify, and separate it. The grain to be thus conditioned is charged into the hopper D and falls down over each plate A in a thin layer of practically equal thickness throughout the apparatus, as provided for by the previous adjustment of the strickling-bars B. By falling from one plate A to the next below it the grain which was before in direct contact with the surface of the plate over which it last rolled will not on the next plate occupy the same relative position, it being practically brought to the top of the other grain at the instant of falling from one to the other plate A. It will thus be seen that throughout its passage through the apparatus the grain is constantly being turned over and over, so that all parts of it may be equally well treated. When passing over the plates A, any particles small enough to escape through the perforations, and which have been introduced with or become detached from the grain, will fall through the interstices or perforations of the plates A onto the plates A', sliding down which they will be brought under the influence of the screw-creepers A³, by which they will be conveyed to and discharged through the side of the apparatus. In a similar manner the separating or grading of the substance under treatment can be effected, the plates A being made removable, so that perforations or openings of any required sizes may be employed for the purpose of allowing particles of various sizes to pass through them. Thus one plate A may have openings of a certain size, while those of the next plate may be of quite a different size.

Now, supposing besides treating the grain in the last-described manner, it be desired also to heat it, for this purpose hot air or other heating medium from a furnace or any other suitable source will be introduced between the plates A and A', through the interstices or perforations of the former of which it will, as indicated by the arrows, pass into and among the grain which is rolling over its surface, the said grain as it descends through the apparatus thus being thoroughly and gradually heated throughout. The vapors resulting from the heating of the moisture contained in the grain, together with other light matter, is drawn through the openings C² into the shafts C by the action of the exhauster by which they are also conveyed to any desired outlet.

If the apparatus is to be used for cooling grain—such, for example, as wheat previously treated in other drying apparatus—atmospheric air under the influence of the exhauster is drawn between the plates A and A'. Through the interstices or perforations in the plate A the air passes through the grain, from which, as it descends through the apparatus, the heat is gradually abstracted until it is ultimately discharged through the chute E in a sufficiently-cooled condition. It

will thus be seen that before being allowed to pass to the exhauster the heated or cool air must all first pass through the substance being treated in the apparatus, so that none of the beneficial properties of the air are lost.

Although the operation of the apparatus has herein been described as applied to the treatment of grain, it will readily be understood that when treating other substances, products, or materials its operation is similar.

The before-described apparatus, although only a necessary portion of it is shown in the accompanying drawing, may be constructed of any desired height or size, and, if found desirable, a portion of it may be used for heating and another portion for cooling the grain.

We claim—

1. In apparatus such as described, the combination, with a perforated hollow shelf, to the interior of which the heating or cooling medium is admitted, of a screw-creeper working in the interior of such shelf for the purpose of removing the matters entering into the shelf, substantially as described.

2. In apparatus such as described, the combination of a series of alternately-inclined perforated superposed hollow shelves adapted to receive the substance to be treated upon their perforated surfaces, each shelf being provided with a series of strickling-bars B, and one or more internal conveyers, the whole constructed and operating substantially as herein described, and illustrated in the accompanying drawings.

In testimony whereof we have hereto set our hands in the presence of two subscribing witnesses.

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