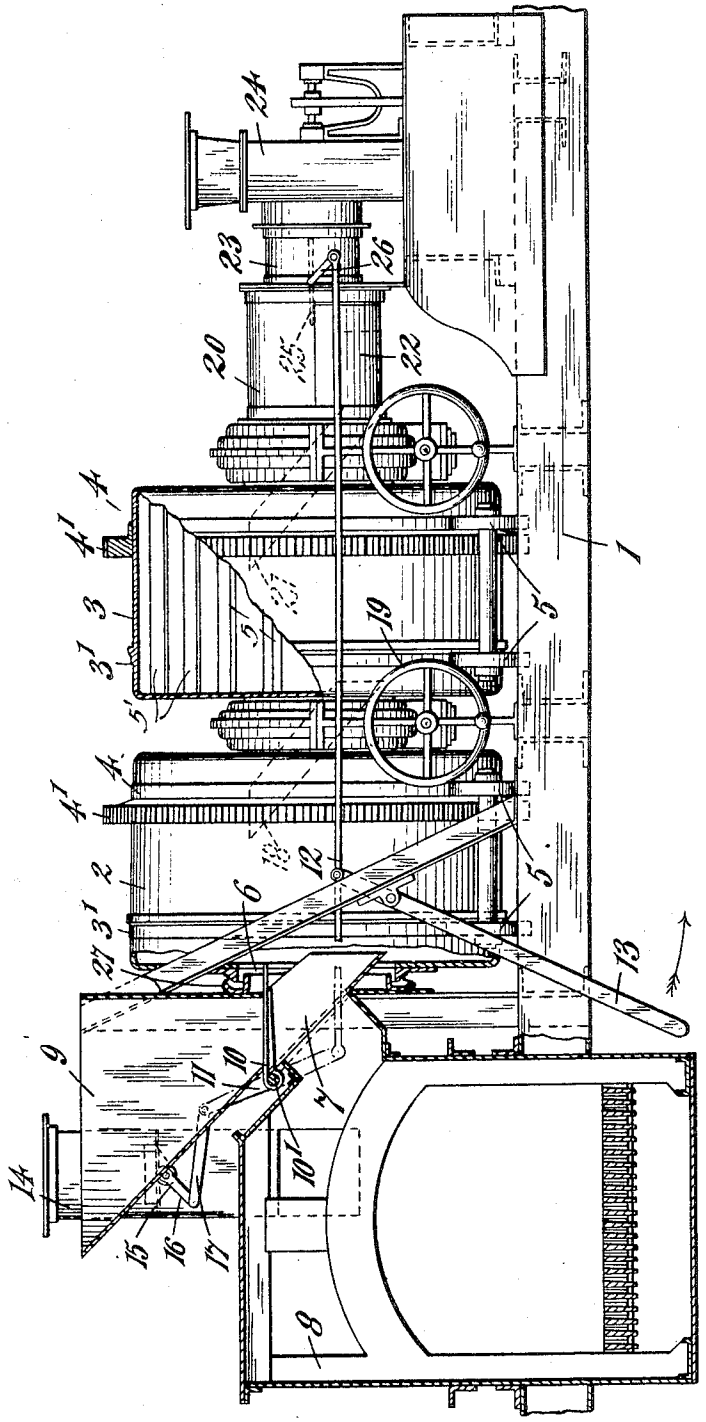
J. E. HOBBS.

DRYING APPARATUS.

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Witnesses

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DRYING APPARATUS.

1,102,662. Specification of Letters Patent. Patented July 7, 1914.

Application filed October 21, 1912. Serial No. 727,016.

To all whom it may concern:

Be it known that I, JAMES EDGAR HOBBS, a subject of the King of Great Britain, residing at Coulsden, in the county of Surrey, England, have invented new and useful Improvements in Drying Apparatus, of which the following is a specification.

This invention has reference to drying apparatus and is designed more particularly for drying stone or like material employed in the production of tar-macadam for roads pavements and similar surfaces but it is to be understood that the invention is not restricted to such use as it may be employed for drying other material or substances.

In drying apparatus as heretofore constructed more especially apparatus for drying stone it has been usual to employ a large drum or drying chamber into which furnace gases are introduced and in which a relatively small charge of material is placed with the consequence that a considerable volume of heated gases flow through the apparatus without effectively coming into contact with the material to be dried and it is one of the objects of the present invention to obviate this disadvantage.

Further objects of the invention are to provide an improved method of and apparatus for rapidly and effectually depriving stone or other material of its superfluous moisture and to provide improved means whereby the operations of charging and discharging the material and the manipulation thereof while in the apparatus may be effected without allowing the external atmosphere to enter the drying chamber or chambers in any great quantity.

In its broadest aspect the invention contemplates a construction in which the drying chamber or chambers is or are provided with means whereby the material to be dried may be moved about within said chamber or chambers in such a manner that every particle thereof shall be thrown directly into the path of a current of fluid circulating within or passing through said chamber or chambers and in which the suction device for such fluid may be prevented from drawing the external atmosphere through the drying chamber or chambers in any great quantity at any time during the operation of the apparatus.

More specifically stated the invention consists in the provision of a drying chamber or chambers having means whereby the material to be dried may be repeatedly lifted or deflected within it means for transferring the material from one drying chamber to another when more than one chamber is provided means for introducing a current of air or gas to said chamber or chambers while the dying operation is in progress means for interrupting the current of air or gas while charging and discharging the material and means for preventing the admission in any great quantity of the external atmosphere to said chamber or chambers at any time during the operation of the machine.

In order that my invention may be readily understood and carried into effect by those skilled in the art to which it appertains I will now proceed to describe the same fully for which purpose reference is to be had to the accompanying drawing which illustrates a side elevation of a drying apparatus embodying my invention parts being shown in section.

Upon a suitable framing 1 are mounted two rovoluble drying chambers or drums 2 and 3. Said drums may be rotated by means of the annular tracks 3′ and 4 on one of which is a gear 4′ adapted to mesh with a gear wheel (not shown) mounted upon the frame of the machine and driven in any suitable manner as by a main driving shaft. Carrying rollers 5 mounted upon the frame 1 may be provided to support the drums. The interior annular wall of each drum is provided with a series of blades wings or deflecting surfaces 5″ whereby the material to be dried may be repeatedly lifted or deflected within the drum so as to throw every particle directly into the path of the drying fluid passing through or circulating within the drum as will presently be explained.

The charging aperture 6 of the drum 2 is in communication with a chute 7 which in turn communicates with the mouth of a furnace 8 for supplying the heated gases. Located above the chute 7 is a hopper 9 provided with a door 10 mounted upon a spindle 10″ to which is attached a lever 11 pivoted to a rod 12 adapted to be operated by a handle 13 whereby said door 10 may be turned from the position shown in full lines in the drawing to that shown in dotted lines in order to cause the contents of the hopper to be delivered into the drum 2 and at the

same time close the mouth of the furnace 8. The furnace is provided with a flue or by-pass 14 in which is located a damper 15 connected by the links 16 and 17 to the lever 11.

Between the drums 2 and 3 a chute 18 is mounted adapted to be operated by a hand wheel 19 or otherwise in such a manner that during the drying operation it shall prevent the passage of material to the drum 3 but when it is desired to transfer the batch from drum 2 to the drum 3 it may be caused to occupy such a position as to fulfil that function.

The conveyance of the dried material from the drum 3 through the stationary discharge chamber 20 is effected by means of a chute 21 mounted in a similar manner to the chute 19 said chamber 20 being provided with a door 22 whereby the dried material may be delivered directly into trucks or barrows. Communicating with the chamber 20 by means of the passage 23 is a fan or other appropriate suction device 24 for drawing the heated gases from the furnace 8 through the apparatus. Arranged within the passage 23 is a damper 25 connected to the rod 12 by a link 26 in order that when charging the drum 2 with a fresh batch of material the fan may be prevented from drawing cold air into the drying drums through the hopper 9. To prevent the admission of the external atmosphere to the drying drums through the space separating the drum 2 from the furnace I may provide a wrapper 27 of leather or other suitable flexible material so arranged that the suction within the drying drums will cause said wrapper to be applied closely to the joint. Similar wrappers may be provided between the drums and between the drum 3 and discharge chamber 20.

The operation of a drying apparatus constructed in accordance with my invention is as follows:—The parts being in the position shown in the drawing hot furnace gases will be drawn by the fan 24 from the furnace 8 through the chute 7, drums 2 and 3 and discharge chamber 20. A batch of material to be dried having been placed in the hopper 9 and the drying drums rotated the operating handle 13 is moved in the direction of the arrow thus shifting the rod 12 to the left and operating the lever 11 to rotate spindle 10′ so turning the door 10 into the position shown in dotted lines thus allowing the charge of material to fall into the drum 2 through the chute 7. With the door 10 in this position the furnace gases will be cut off from the drums and will pass into the flue or by-pass 14 the damper 15 having been opened by means of the links 16 and 17 at the same time that the door 10 is actuated. The movement of the rod 12 to the left will also actuate the damper 25 in the passage 23 thus interrupting the suction of the fan 24 and so preventing the external atmosphere from being drawn through the drying drums. The handle 13 is now returned to its original position so closing damper 15 and the discharge orifice of the hopper 9 by means of its door 10 and opening damper 25 thus allowing the fan 24 to draw the furnace gases through the chute 7, drums 2 and 3, chamber 20 and passage 23. As the drum 2 revolves the material therein will be repeatedly lifted up by the blades wings or the like with which it is provided and allowed to fall to the lower portion of the drum thus being continuously moved about within the drum directly in the path of the hot gases drawn through the apparatus. After a sufficient period the batch is transferred to the drum 3 by means of the chute 18 and a fresh charge of material introduced into drum 2 in a manner similar to that above described. The batch in drum 3 when sufficiently dried is finally discharged through the chamber 20 by means of the chute 21 and the door 22. An apparatus as above described operates on the batch principle that is to say batches of material are passed from one drum to the next at definite intervals of time so that in the case of two drying drums while a batch of material could be delivered at intervals of say three minutes the material would be in the apparatus six minutes.

It is to be understood that the invention contemplates the employment of one or a plurality of drying chambers or drums according to the nature of the material to be treated and the result it is desired to attain and said drums instead of being rotatably mounted and provided with fixed blades wings or equivalent devices for moving the material about within them may be fixed and movable blades or beaters operated in any suitable manner may be provided for the purpose. It is to be further noted that the drying drums may be rotated other than by the means hereinbefore described for example I may mount them upon a central shaft driven in any appropriate manner.

In cases where the admission of small quantities of air to the apparatus would not be prejudicial I may with a view to simplifying the construction dispense with the flue 14 altogether and arrange the door 10 so that it does not completely close the mouth of the furnace. Enough draft from the fan will then pass by the damper 25 when in its closed position to draw sufficient of the furnace gases through the apparatus to prevent said gases issuing from the furnace door.

It will be understood that while I have shown and described the preferred form of my invention, that I do not wish to be limited thereto except for such limitations as the claims clearly import.

I claim:

1. A drying apparatus comprising the combination with a furnace and a suction device, of a drying drum, a hopper for charging material into said drum, means located within said drum whereby the material may be moved about within said drum, means for discharging the dried material from the drum, and means for interrupting the flow of the furnace gases during the charging and discharging operations.

2. A drying apparatus comprising the combination with a furnace, of a plurality of revoluble drying drums having deflecting surfaces therein, means for rotating said drums, a hopper for charging a batch of material into the first of said drums, chutes for transferring the material from one drum to the next, means for causing the gases from the furnace to flow through said drums, means for discharging the dried material from the last drum, and means for interrupting the flow of furnace gases during the charging and discharging operations.

3. A drying apparatus comprising the combination with a furnace provided with a by-pass and a suction device, of a plurality of revoluble drums having means therein whereby the material may be moved about within them, means for rotating said drums, a hopper for charging a batch of material into the first of said drums, a door for said hopper, and means whereby said door may be so positioned that during the charging and discharging operations the gases from the furnace will be prevented from passing into the drying drums, means co-acting with the actuating mechanism for said door whereby communication between the drying drums and the suction device will be interrupted and the by-pass for the furnace gases opened substantially as described.

4. In a drying apparatus, the combination with a furnace provided with a by-pass, a plurality of drums and a suction device, said furnace, drums and suction device being arranged in series and communicating with each other, of a valve between the furnace and drums, a second valve between the drums and suction device, a third valve controlling the bypass, and a lever and link mechanism to simultaneously operate all of said valves.

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Witnesses:
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