A. C. BRANTINGHAM.

SELF CONTROLLING HEATER.

APPLICATION FILED NOV. 22, 1913.

1,158,624. Patented Nov. 2, 1915.

3 SHEETS—SHEET 1.

FIG. 1

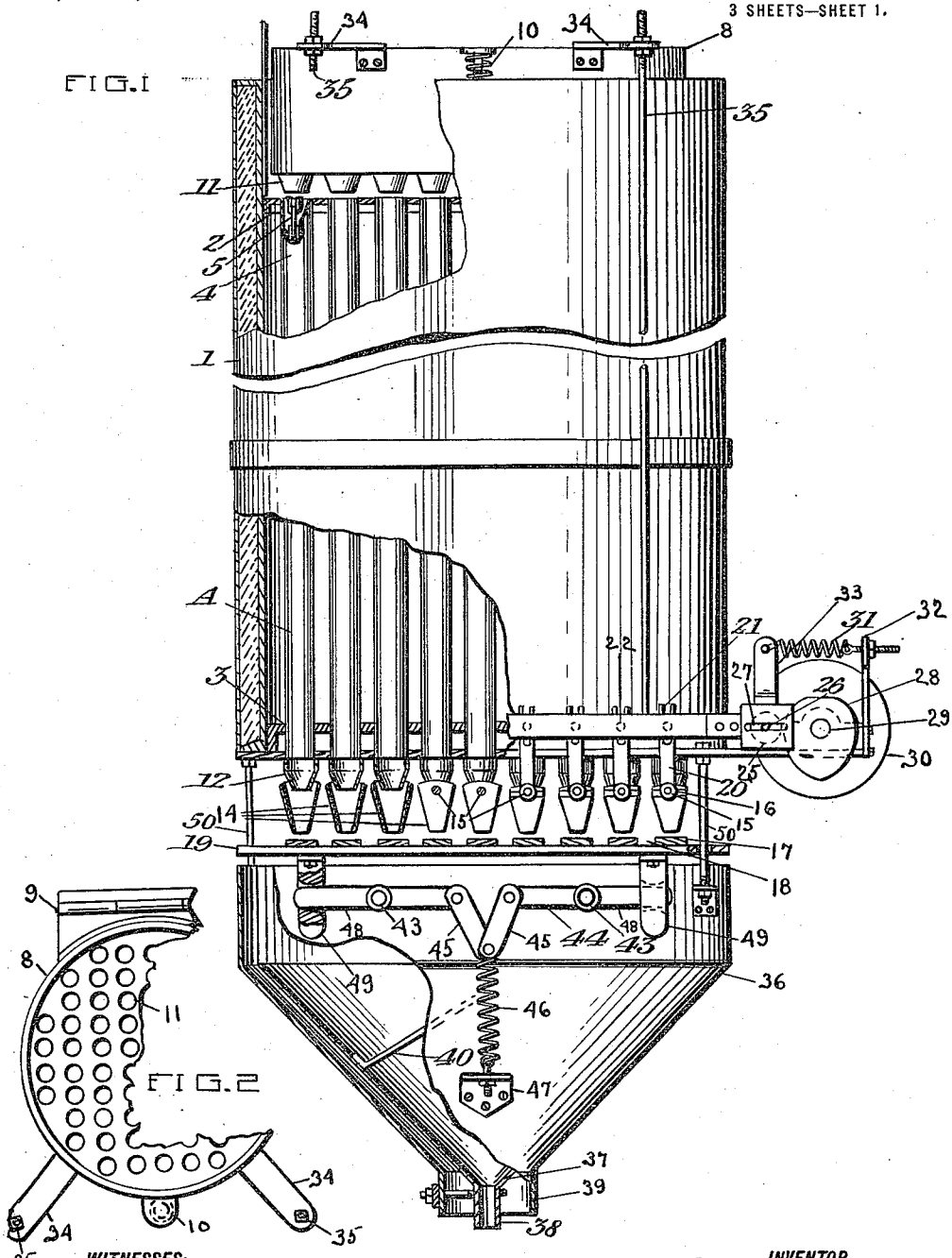


FIG. 2

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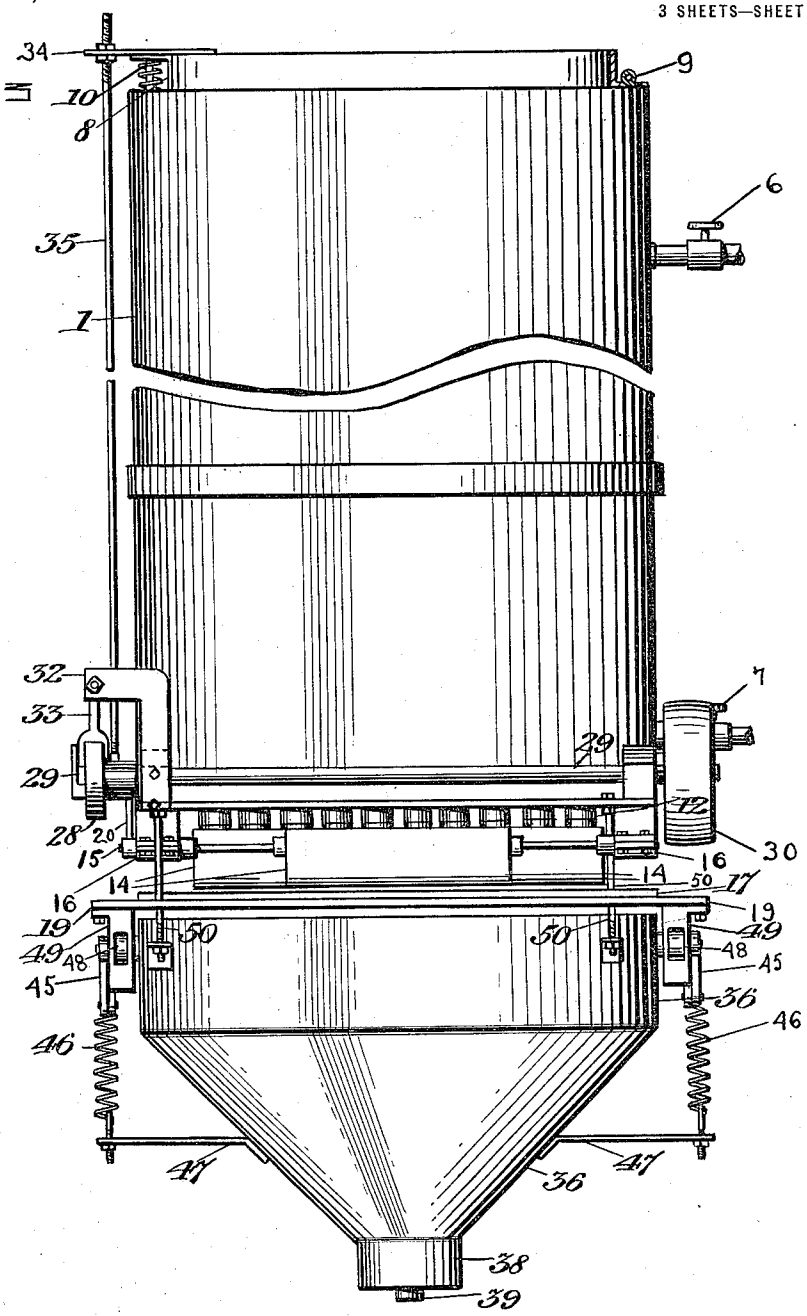
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3 SHEETS—SHEET 2.

FIG. 3



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3 SHEETS—SHEET 3.

FIG. 4

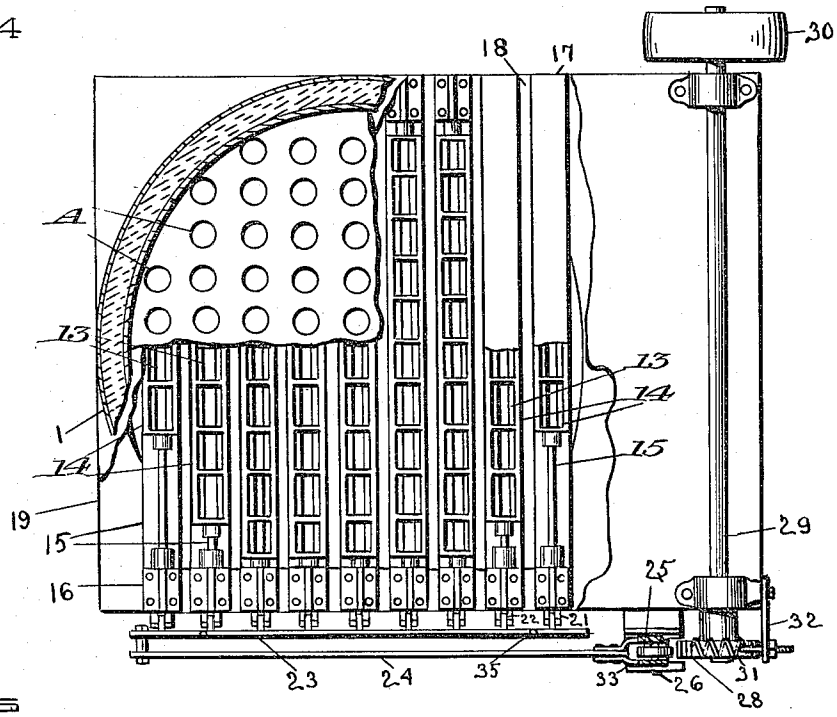
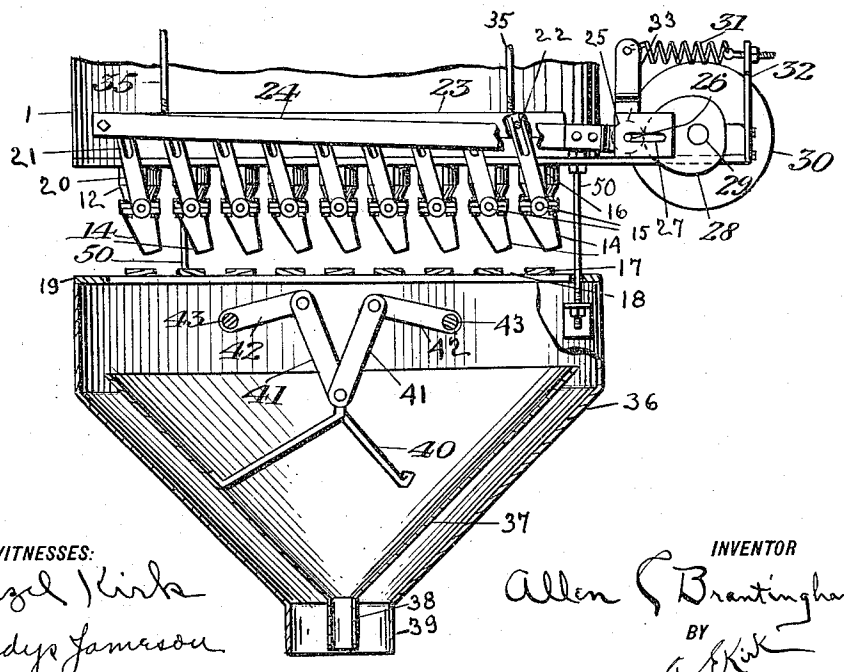


FIG. 5



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UNITED STATES PATENT OFFICE.

ALLEN C. BRANTINGHAM, OF TOLEDO, OHIO, ASSIGNOR TO C. G. HAMMOND, TRUSTEE, OF SILVER CREEK, NEW YORK.

SELF-CONTROLLING HEATER.

1,158,624. Specification of Letters Patent. Patented Nov. 2, 1915.

Application filed November 22, 1913. Serial No. 802,391.

To all whom it may concern:

Be it known that I, ALLEN C. BRANTINGHAM, a citizen of the United States, residing at Toledo, Lucas county, Ohio, have invented a new and useful Self-Controlling Heater, of which the following is a specification.

This invention relates to the handling of a stream of material, especially in adjustments to take care of a varying stream.

This invention has utility in connection with devices for treating material, as tubular grain heaters.

Referring to the drawings: Figure 1 is an elevation, with parts broken away, of an embodiment of the invention in a grain heater; Fig. 2 is a fragmentary plan view of the receiving controlling member or hopper; Fig. 3 is a view looking from the right of the showing in Fig. 1; Fig. 4 is a plan view of the hopper drive, with parts of the heater broken away; and Fig. 5 is a fragmentary side elevation of the hopper drive.

The treating device or heater 1 is provided with the heads 2, 3, between which extend a plurality of ways 4 for the flow therethrough of the material to be heated. Baffles 5 are disposed in the ways 4. The space outside the ways 4 and within the heater 1 may be a reservoir for a heating medium, as steam, supplied through the valve 6 with the outflow or condensation taken off by way of the valve 7. Valve adjustments may be made to meet the treating conditions desired.

The material to be treated is delivered in a stream into the yieldable flow controlling member or receiving hopper 8 mounted by the hinge 9 for movement relatively to the heater 1. The yieldable means or sustaining spring 10 laterally of the member 8 serves to maintain the member 8 in normal poised position, while permitting downward movement of the member 8 as the load increases. This downward movement of the member 8 is about the hinge 9. As the load decreases, the spring 10 will cause the member 8 to return upward. The single spring insures uniform action without any tilting or cramping in the automatic control as actuated by the material.

The tubular ways 4 are supplied with material by the registering openings 11 in the member 8. The material from the ways 4 passes out the lower nozzle shaped ends 12 of the ways 4 into the compartments 13 of the tilting hoppers 14 mounted on trunnions 15 coacting with the bearing brackets 16 extending downward from the heater 1. The compartments or hoppers 13 are arranged in series for each row of ways 4, each series being above a slat 17 of the platform. Between the slats 17 are slots 18 for the spill of material as forced off the slats 17 by the material as supplied by the hoppers. The platform frame 19 carries the slats 17.

Rigid with each hopper series 14 and mounted on its trunnion 15 is an arm 20 having a slot 21 with which engages a pin 22 carried by the reciprocable bar 23. Pivotally connected to the bar 23 is the bar 24 carrying the roller 25 held in position therewith by the pin 26. The pin 26 also coacts with the guide slot 27, thereby confining the reciprocations as brought about by the cam 28 on the shaft 29 as continuously driven by the pulley 30. The return travel of the bar 24, to effect the complete reciprocation of the element or pin 22, is caused by the spring 31 mounted in the fixed bracket 32 and extending to the bracket 33 rising from the bar 24 adjacent the roller 25. Accordingly as the cam 28 rotates, the tension spring 31 keeps the roller 25 thereagainst at all times. Action of this driving means thus serves to tilt or rock the hoppers so that material is crowded first toward one side of the slats 17 and then toward the other, to bring about a definitely adjustable flow of material. This precludes any rushing through one way in excess of travel rate through another way, making possible most uniform regular treatment or heating.

In practice, especially in flour milling work where wheat is the material to be treated, the device is conveniently installed in connection with the other equipment to handle the regular stream of stock or material. Under these circumstances it is important that the flow of material to the heater be passed along. The device is self-controlling for caring for such conditions. The loading up of the hopper 8 causes it to settle down, against the resistance of the spring 10. The hopper 8 has the brackets 34 car-

rying the rods 35 serving as connecting means between the receiving control member and the bar 23. The settling of the member 8 moves the bar 23 to shorten the effective length of the hopper arms 20, and with the actuation of the bar 23 constant, the tilt of the hoppers 14 is increased and likewise the material flow made greater. As this increased discharge rate from the device reduces the surplus in the member 8, normal conditions are automatically resumed.

In cases of accident cutting off material supply, or in shutting down, say of a flour mill, it is desirable to avoid excessive treatment of material in the device, as overheating or scorching of the wheat being treated. This objectionable situation is also automatically overcome. The material passing through the slots 18 enters the main discharge hopper 36 which contains an auxiliary hopper 37 having the outlet 38 adjacent the outlet 39 of the hopper 36. There is thus a leakable member 37 to which material is supplied. This member 37 is movable and is held yieldably in position by the bracket 40 connected to the links 41 engaging arms 42 on the shafts 43 mounted in the hopper 36. Outside the hopper 36 these shafts 43 have arms 44 connected to links 45 engaging springs 46 anchored in brackets 47 mounted on the hopper 36. The tension springs 46 are adjusted to care for the normal flow of the treating device in the loading of the auxiliary hopper 37 for flow through the opening 38 as well as overflowing into the hopper 36, if so set.

As the load falls below the set flow rate for the hopper 37, the springs 46 tend to lift the hopper 37. This movement, through the arms 48 on the shafts 43 engaging the sustaining brackets 49 for the slotted platform 19, serves to move the platform slats 17 away from the lower ends of the hoppers 13, *i. e.*, from the position shown in Fig. 1 to the position shown in Fig. 5. This travel of the leakable member or auxiliary hopper 37 upward, moves the flow check member or platform slats 17 away from flow stopping position. When the slats 17 are thus moved downward, even with the hoppers 13 not tilted, there is sufficient spacing from the lower ends thereof that the angle of repose of the wheat may allow of flow over the sides of the slats and through the slots 18 for automatic emptying of the heater. Upon reloading of the hopper 37, it automatically returns the slats 17 to flow checking position. This action of the emptying mechanism is independent of any driving of the hoppers.

In operation, the cam 28 is continuously driven. The heater is receiving a regular stream of material, say wheat for heating. The member 8 discharges the wheat through the various openings 11 into the ways 5 for passing therethrough and being treated. The ways 5 deliver to the several hoppers 13, which in their tilting gradually work the grain off the slats 17 for falling into the discharge hoppers. The tilt of the hoppers 13 is varied by the member 8 acting through the rods 35 to move the bar 23 to shorten or lengthen the arms 20 as to effective length thereof. The material falling through the slots 18 normally keeps the auxiliary hopper 37 poised to maintain the slats 17 in flow checking position as to the hoppers 13. Slackening of material supply allows the hopper 37 to lighten, permitting upward movement which draws the slats 17 away from the hoppers 13 to increase the material flow. This condition arising at cessation of material supply, serves to automatically empty the heater. The movement of the flow check platform member 19 toward and from the hoppers 14 is on the guide rods 50.

What is claimed and it is desired to procure by Letters Patent is:

1. A multiple way heater provided with a flow controlling member having a discharge opening for each way, and yieldable sustaining means for the member.

2. A multiple way heater provided with a yieldable flow controlling material receiving member having a discharge opening for each way, and a sustaining spring therefor for the member.

3. A multiple way heater having in combination with its multiple ways a laterally hinged material flow controlling member, and a single lateral sustaining spring therefor.

4. A heater provided with a material flow-way, a heating jacket for said way, and a hinged material flow receiving member independently of its position disposed always to deliver to said way.

5. A multiple way heater provided with a hinged material flow controlling member having a discharge opening for each way, and yieldable sustaining means therefor.

6. A multiple way heater having in combination with its multiple ways a hinged material flow controlling member, and a sustaining spring therefor.

7. A treating device for material and an adjustable hopper movable independently of the device for controlling material flow through the device.

8. A treating device for material, a series of hoppers for controlling material flow, a common discharge passage into which each of said hoppers delivers and driving means for tilting the hoppers.

9. A treating device for material, hoppers for controlling material flow, and driving means for variably rocking the hoppers.

10. A treating device for material, hop-

pers for controlling material flow, and driving means for rocking the hoppers including a variable length actuating arm.

11. A treating device for material, hopper material flow controlling means, continuous driving means for the flow controlling means, and an adjustable connection between the means.

12. A treating device for material, hopper material flow controlling means, continuous driving means for the hopper means, and an automatically adjustable connection between the means.

13. A treating device for material, hopper material flow controlling means, driving means for the hopper means, and a material flow controlled connection between the means.

14. A treating device for material, hopper material flow controlling means, driving means for the hopper means, a connection between the means, and a flow actuated member to adjust the connection.

15. Material flow controlling means embodying a slotted arm hopper, driving means for tilting the hopper including a reciprocable element engaging the slotted arm, and a movable material flow actuated member for varying the engagement of the reciprocable element in the arm to adjust the hopper control.

16. Material flow controlling means embodying a plurality of hoppers, a laterally fixed slotted platform therebelow, and means for tilting the hoppers to effect discharge of material through the slots of the platform.

17. Material flow controlling means embodying a plurality of hoppers, a slotted platform therebelow, driving means for varying the position of the hoppers relatively to the platform, and adjusting means independently of the platform for varying material flow.

18. A treating device for material, and emptying means therefor embodying a leakable member, a flow check member, and connections from the leakable member for moving the check member out of flow checking position.

19. A treating device for material, and emptying means therefor including a flow check member therebelow movable toward and from the device, and controlling means for the check member.

20. A treating device for material, and emptying means therefor including a slotted flow check member, and an auxiliary leakable hopper connected to move the check member into and out of flow checking position as the hopper is more or less loaded.

In witness whereof I hereunto set my hand in the presence of two witnesses.

ALLEN C. BRANTINGHAM.

Witnesses:

E. R. KIRKENDALL,

GEO. E. KIRK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Correction in Letters Patent No. 1,158,624.

It is hereby certified that in Letters Patent No. 1,158,624, granted November 2, 1915, upon the application of Allen C. Brantingham, of Toledo, Ohio, for an improvement in "Self-Controlling Heaters," an error appears in the printed specification requiring correction as follows: Page 2, line 98, claim 2, strike out the word "therefor"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of November, A. D., 1915.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.

Cl. 34—34.