

A. J. KOEGLER.
SECTIONAL GRAIN HEATER.
APPLICATION FILED SEPT. 7, 1909.

969,484.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 1.

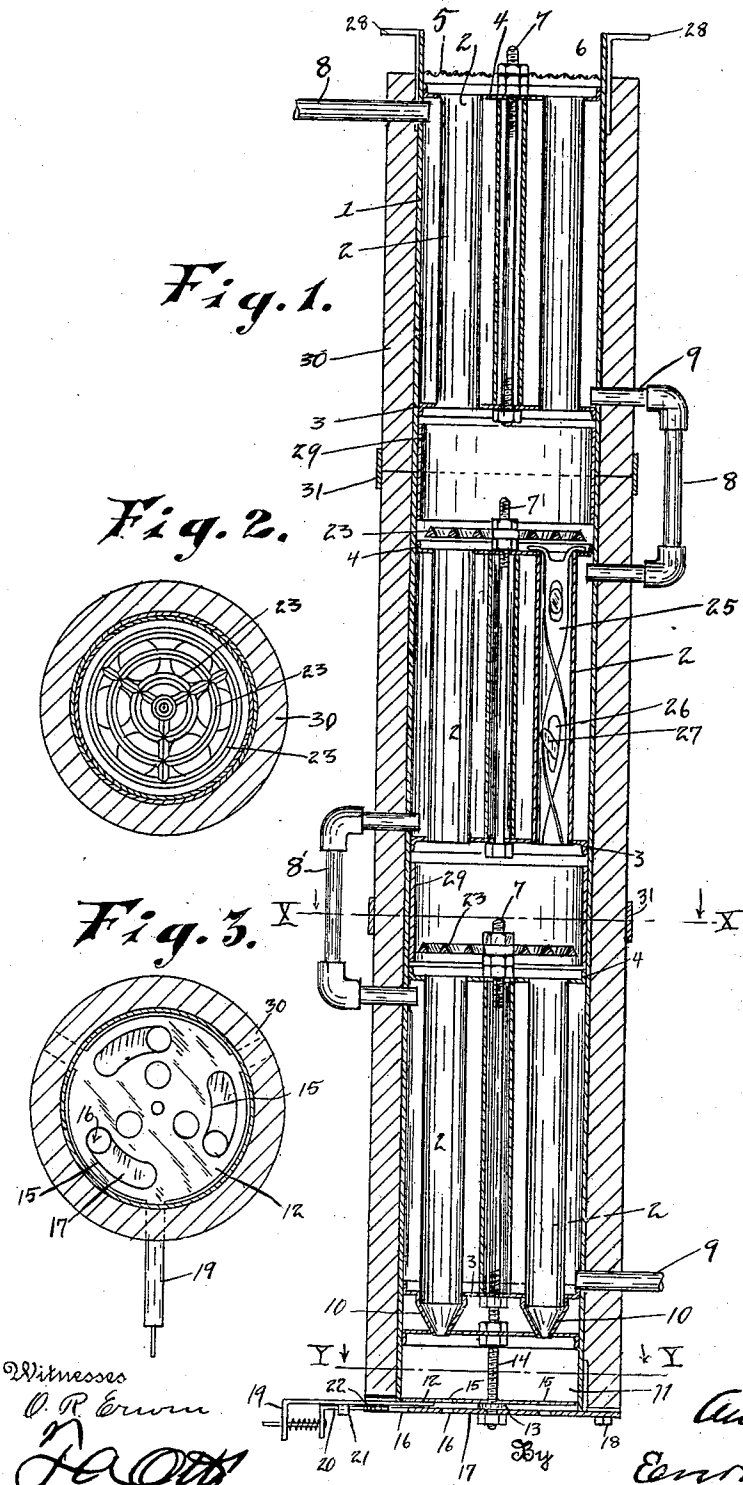


Fig. 1.

Fig. 2.

Fig. 3.

Witnesses
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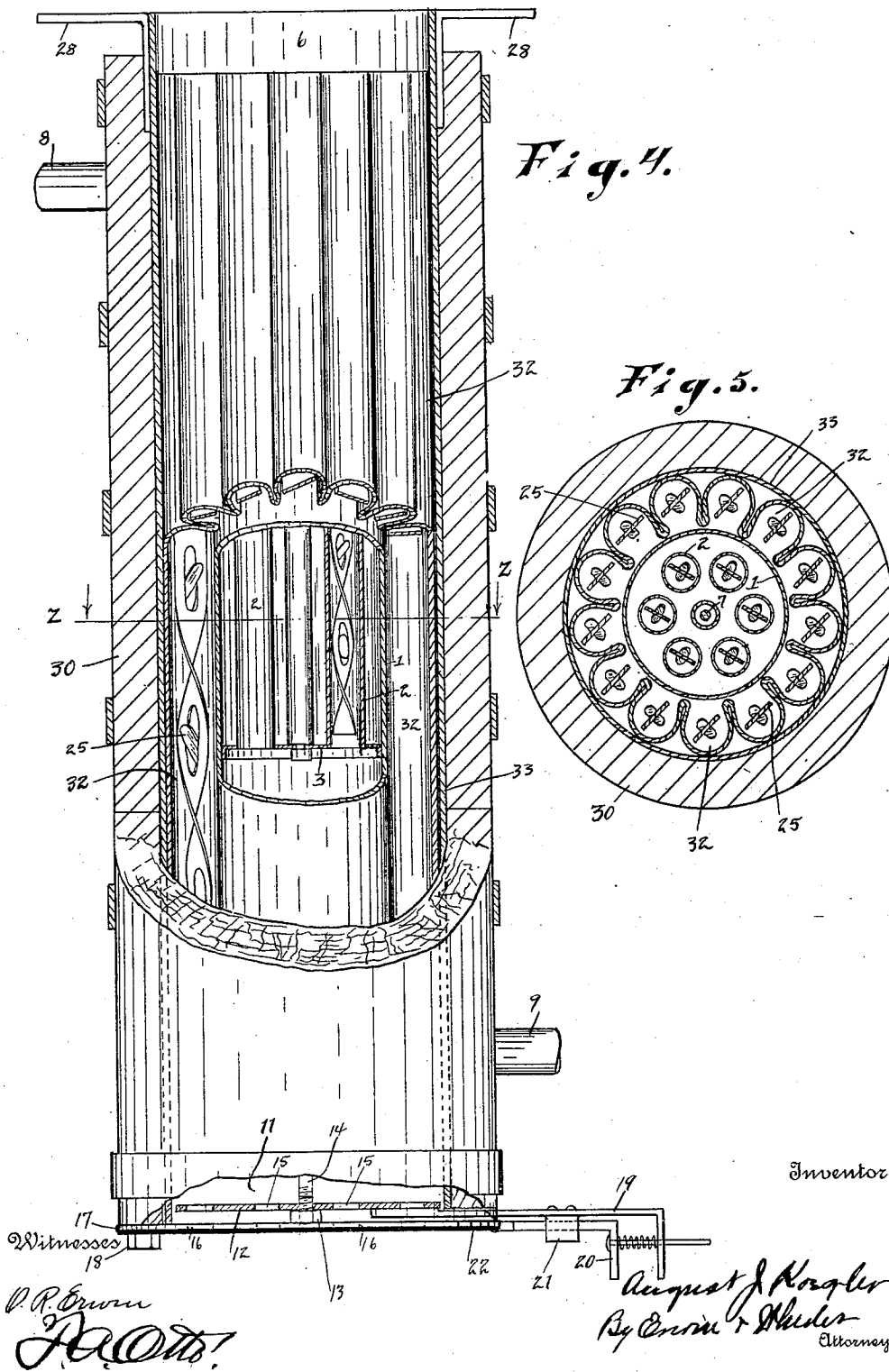
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3 SHEETS—SHEET 2.



Witnesses

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3 SHEETS—SHEET 3.

Fig. 8.

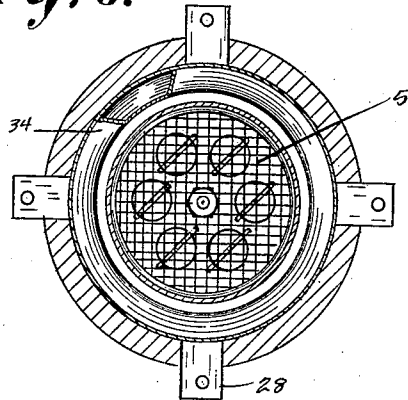


Fig. 6.

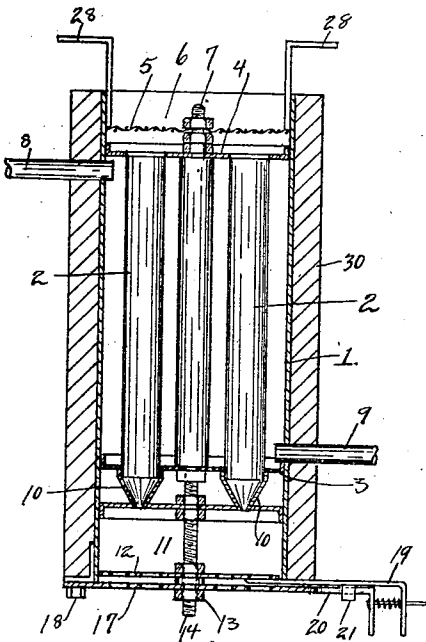
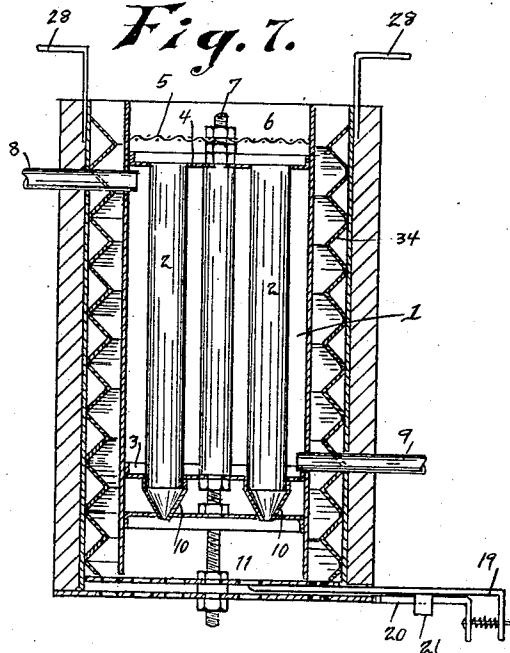


Fig. 7.



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UNITED STATES PATENT OFFICE.

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SECTIONAL GRAIN-HEATER.

969,484.

Specification of Letters Patent.

Patented Sept. 6, 1910.

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To all whom it may concern:

Be it known that I, AUGUST J. KOEGLER, a citizen of the United States, residing at Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Sectional Grain-Heaters, of which the following is a specification.

My invention relates to improvements in that class of grain heaters in which grain is heated while flowing through steam heated tubes, which are vertically supported in an inclosing steam chamber.

It is a well known fact that the grinding capacity of flour mills vary greatly, and that for this reason, it has been necessary to manufacture a great variety of sizes of grain heaters, that each mill may be supplied with a heater of a capacity corresponding with the work to be done therein.

The object of my present invention is therefore to avoid the necessity of making heaters of different sizes and instead to provide a heater comprising a plurality of sections, all of which are of the same size and any one of which is adapted to meet the requirements of the smallest mill, while the requirements of the largest mill is met by coupling together in a single vertical series such a number of sections as are necessary to meet the requirements of the particular mill where it is to be located, and whereby the necessity of making heaters of different sizes as heretofore is avoided.

The construction of my invention is explained by reference to the accompanying drawings, in which,

Figure 1 represents a vertical section thereof showing a plurality of separable sections coupled together. Fig. 2 is a transverse section drawn on line $x-x$ of Fig. 1. Fig. 3 is a transverse section drawn on line $y-y$ of Fig. 1. Fig. 4 is a vertical section of a modified form of heater, which is more especially adapted to be used for heating corn, while the heater shown in the other figures 1 to 3 inclusive, are adapted to heating wheat. Fig. 5 is a transverse section drawn on line $z-z$ of Fig. 4. Fig. 6 represents a vertical section of one of the separable members of a heater, as constructed when used alone. Fig. 7 represents a side view, part in section of the heater, showing a modified form of grain passages located between the steam chamber and the exterior inclosing wall, and Fig. 8 is a top view of the device shown in Fig. 7, part in section.

Like parts are identified by the same reference numerals throughout the several views.

1 is a steam chamber, which is preferably made cylindrical and the same is provided with a plurality of vertical grain tubes 2, which are supported at their lower ends in the heads or end members 3, and at their upper ends in the heads of end members 4, such tubes having steam tight connection in said heads, and said heads having steam tight connection with the wall of the steam chamber 1.

5 represents a screen which is located in the steam chamber above the grain tubes through which screen the grain passes from the receptacle 6 to the tubes 2.

7 is a stay bolt, which extends longitudinally through each section of the heater, and serves to support and strengthen the respective heads.

8 is an inlet steam pipe through which the steam chamber 1 is supplied with steam.

9 is an outlet duct, through which steam and water of condensation escapes from the heater.

10 are funnels which are loosely fitted to the lower ends of the grain tubes 2, and serve to conduct the grain from the lower end of the tube into the lower chamber 11. The escape of grain from the chamber 11 is controlled by an adjustable disk 12, which serves as a regulator for controlling the passage of grain through the heater. The disk 12 is centrally supported upon the collar 13, by and around the central shaft 14, and said disk 12 is provided with a plurality of elongated apertures 15, which are adapted to register with the apertures 16 formed in the stationary bottom member 17, which member is secured to the heater by a plurality of bolts 18.

19 is an operating lever by which the regulating disk 12 is turned a partial revolution around its supporting shaft 14.

It will be understood that when the apertures 15 of the regulating disk are adjusted in alinement with the apertures 16 of the bottom member, that the grain will flow at its maximum speed and the flow of grain is retarded or cut off by turning the disk member 12 a partial revolution upon its supporting shaft until said apertures are brought partially or wholly out of alinement with each other. The operating lever 19 is provided with a spring actuated latch

20, which is slidably connected with the lever 19 through the retaining keeper 21, and said latch is adapted to engage at its inner end in the notches 22 provided therefor in the periphery of the bottom member 17, whereby said regulating disk is retained at any desired point of adjustment.

When my heater is used for mills of the smallest capacity, a single section only, like that shown in Fig. 6 is required for heating the grain, and when a single section is thus used, it is necessary owing to the limited heating surface to so adjust the regulating disk 12 that the grain will be caused to pass slowly through it. When thus using a single section for a mill of small capacity, a screen 5 is used at the upper end, and a series of funnels 10 and a regulating disk at its lower end, as shown in said Fig. 6. When, however, a plurality of sections are used as required for mills of larger capacities, as shown in Figs. 1 and 4, the screen 5 is only used at the upper end of the upper section and the funnels 10 and regulating disk 12 are used only at the lower end of the lower section, and when a plurality of sections are thus coupled together, I preferably interpose a grate 23 between the opposing end of each section of the series as shown in Fig. 1, whereby the grain as it passes from the heating tubes 2 of the upper section to the heating tubes of the next and each succeeding lower section, will be deflected by the bars of said grate and will thereby become more thoroughly mixed and uniformly heated. The bars of the grates 23 are preferably made V shaped in cross section, as shown in Fig. 1, and said bars are preferably arranged in an annular series, as more clearly shown in Fig. 2. When thus using several sections together, the steam which enters the upper section through the duct 8, passes from the lower end of such section to the next and each succeeding section below through the side duct 8', one end of which side duct is connected with the lower end of the upper section, and its opposite end with the upper end of the next succeeding section below, and such side ducts preferably alternate with each other, being connected at opposite sides of the heater, whereby the current of steam passing from the inlet duct 8 to the outlet duct 9 is more uniformly distributed around the grain heating tubes.

25 is a deflecting member, which is preferably formed of a strip of thin sheet metal, provided at short intervals with central apertures 26 and inclined plates 27. The member 25 is spirally bent, whereby the grain in passing from the upper to the lower end of the heating tubes is forced outwardly from the center of said tubes and in contact with the heating surface of the tubes, whereby all the grain passing through the tubes

becomes uniformly heated. I do not, however, make a special claim for the deflecting member 25 or the regulating device in this application, as the same is made the subject matter of separate applications.

28 is a suspension flange by which the heater may be suspended from the ceiling of the compartment where located.

29 is a reinforcing collar, which is preferably interposed between the opposing ends of the respective sections and serves to support the sections in alinement with each other.

30 is a cover of ordinary construction, which is formed of asbestos or other non-heat conducting material, and 31 is a band for closing the joint in the covering between the several sections.

My heater thus far described is more especially adapted to be used for heating wheat and other small grains. When, however, the heater is used for heating corn or other coarse grain, I preferably interpose a series of grain ducts between the wall of the heating chamber and the wall 33 of the covering, upon which the non-heat conductor 30 is supported, while the grain tubes 2, located within the steam chamber 1, are constructed substantially as shown and described in Figs. 6 and 1 to 3 inclusive.

For convenience of construction, the grain ducts 32 are preferably formed of a single piece of sheet metal, which is bent or corrugated so as to form a plurality of passages, U shaped in cross section, as shown in Fig. 5, such passages being open toward the steam chamber 1, whereby the heat radiated through the wall of the steam chamber 1 is brought in direct contact with the grain in said ducts. The grain ducts 32 are also provided with deflecting members 25.

While I preferably provide the space outside of the steam chamber with a vertical series of ducts, as shown in Figs. 4 and 5, it may be provided with an annular series of corrugations 34, as shown in Fig. 7, arranged one above the other, whereby the grain as it passes through such space is deflected inwardly and brought in contact with the heated surface of the steam chamber and thereby becomes uniformly heated.

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

1. In a grain heater, the combination of a steam chamber, a covering and a covering supporting wall located at a distance from and around said steam chamber, an annular chamber located between said steam chamber and supporting wall for the passage of grain, a plurality of grain ducts located in said steam chamber, means for deflecting and agitating the grain as it flows through said grain ducts and annular chamber, means for simultaneously conducting grain

to said ducts and annular chamber, and means for regulating the discharge of grain from the lower end of said ducts and annular chamber.

5 2. In a grain heater, the combination of a steam chamber, a plurality of separable sections connected together in a vertical series, one above the other, a plurality of grain
10 ducts located in the steam chamber of said sections, means for agitating the grain as it passes through the heating ducts of the respective sections, and means for regulat-
ing the discharge of grain from the lower section.

15 3. In a grain heater, the combination of a steam chamber, a plurality of separable sections connected together in a vertical series, one above the other, a plurality of grain
20 ducts located in the steam chamber of said sections, means for agitating the grain as it passes through the heating ducts of the respective sections, means for regulating the discharge of grain from the lower section,
25 a steam duct communicating from the supply with the upper section of said series,

side ducts communicating from the lower end of the upper section to the upper end of the next and each succeeding lower section of the series, and an outlet duct leading from the lower end of the lower section of
30 the series.

4. In a grain heater, the combination of a steam chamber, a plurality of separable sections connected together in a vertical series one above the other, a plurality of grain
35 ducts located in the steam chamber of said sections, a screen located above the grain tubes of the upper section of the series, a deflecting grate located in the space between the grain tubes of the upper and lower sections,
40 a removable deflecting agitator located in each of the grain ducts of the respective sections and means for regulating the discharge of grain from the lower section.

In testimony whereof I affix my signature
45 in the presence of two witnesses.

AUGUST J. KOEGLER.

Witnesses:

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LEVERETT C. WHEELER.