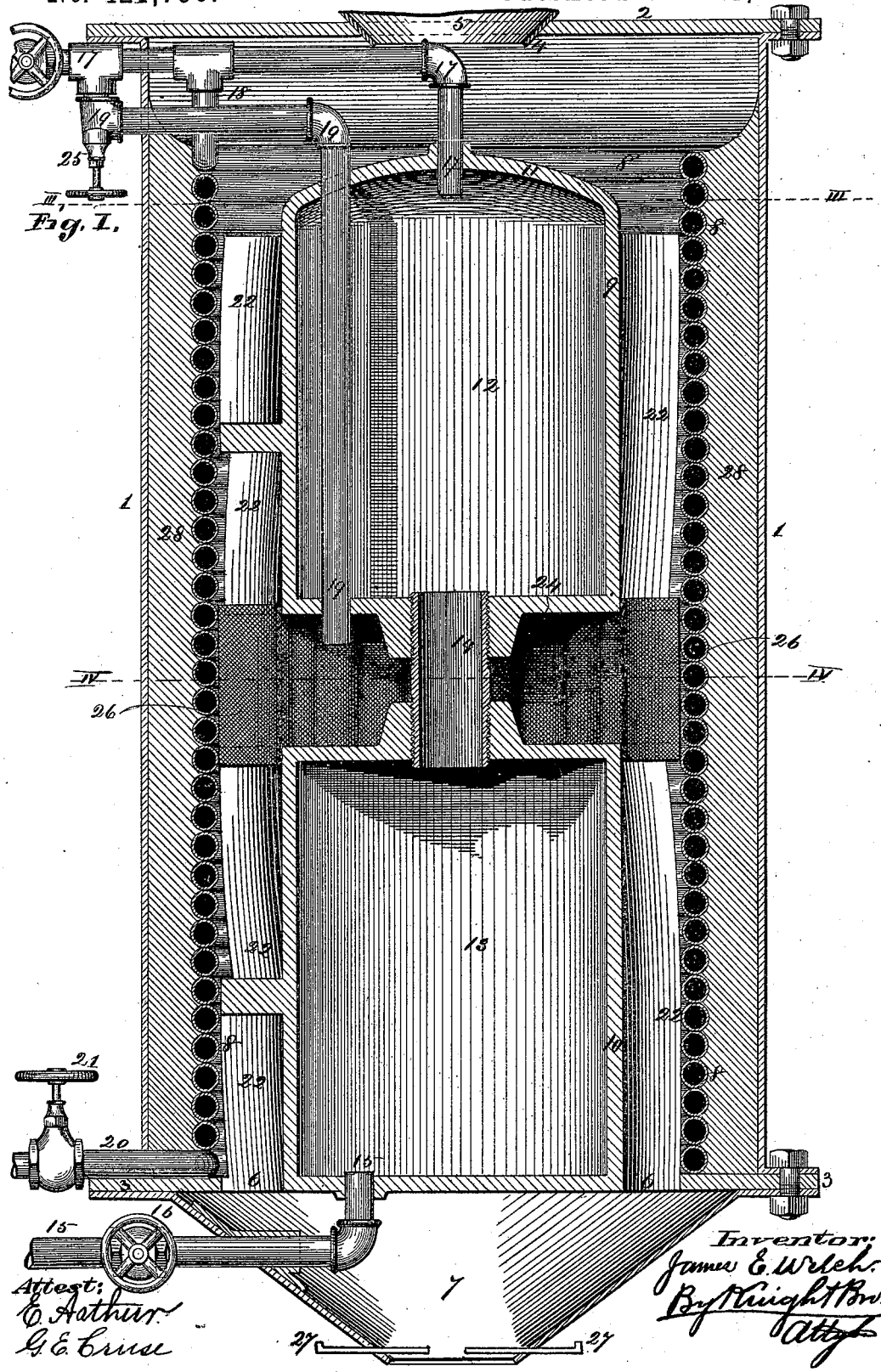
(No Model.) 3 Sheets—Sheet 1.

J. E. WELCH.

WHEAT HEATER.

No. 421,796. Patented Feb. 18, 1890.



N. PETERS, Photo-Lithographer, Washington, D. C.

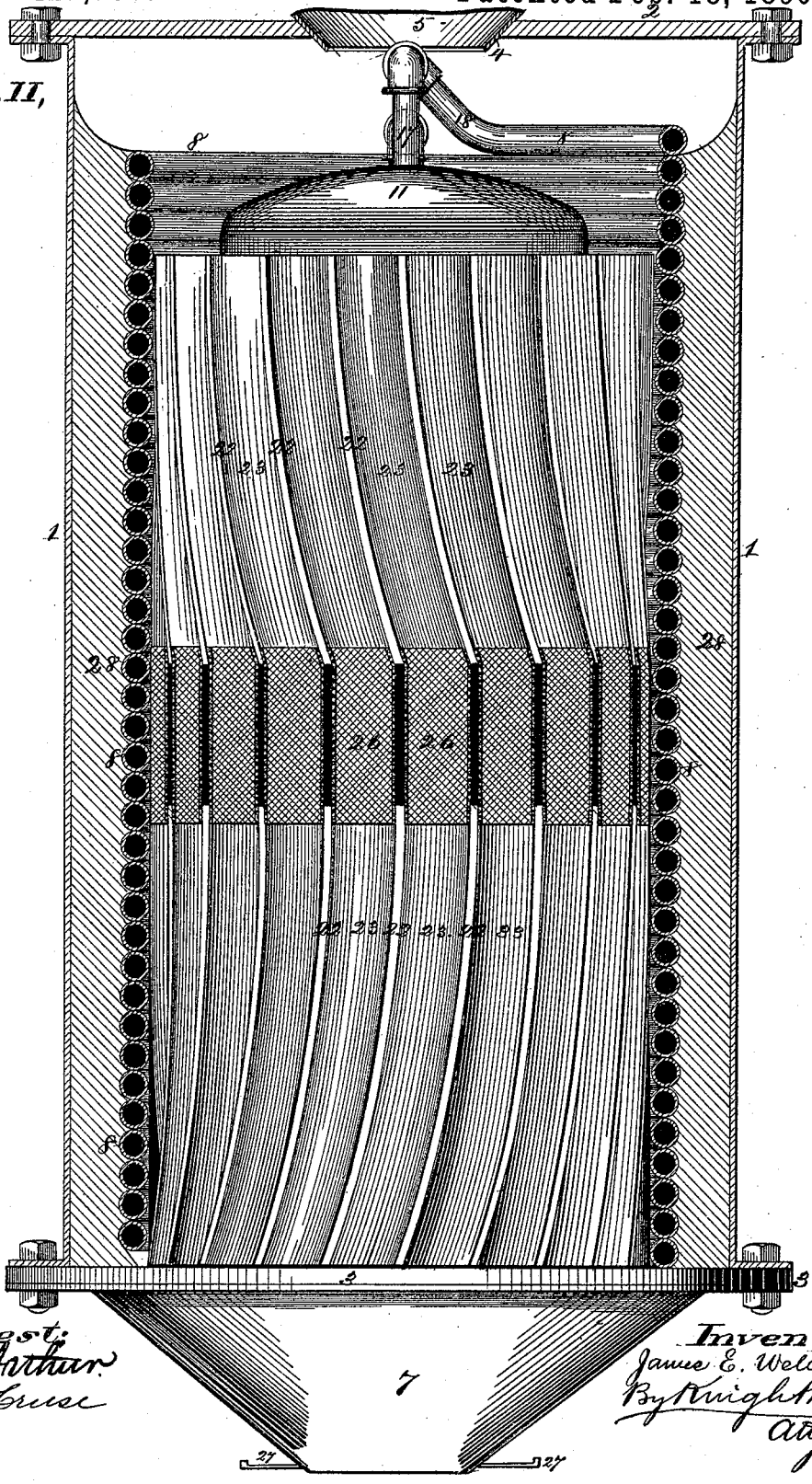
(No Model.) 3 Sheets—Sheet 2.

J. E. WELCH.

WHEAT HEATER.

No. 421,796. Patented Feb. 18, 1890.

Fig. II.



Attest:
C. Arthur
G. E. Crase

Inventor,
James E. Welch.
By Knight Bros.
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

J. E. WELCH.

WHEAT HEATER.

No. 421,796. Patented Feb. 18, 1890.

Fig. III.

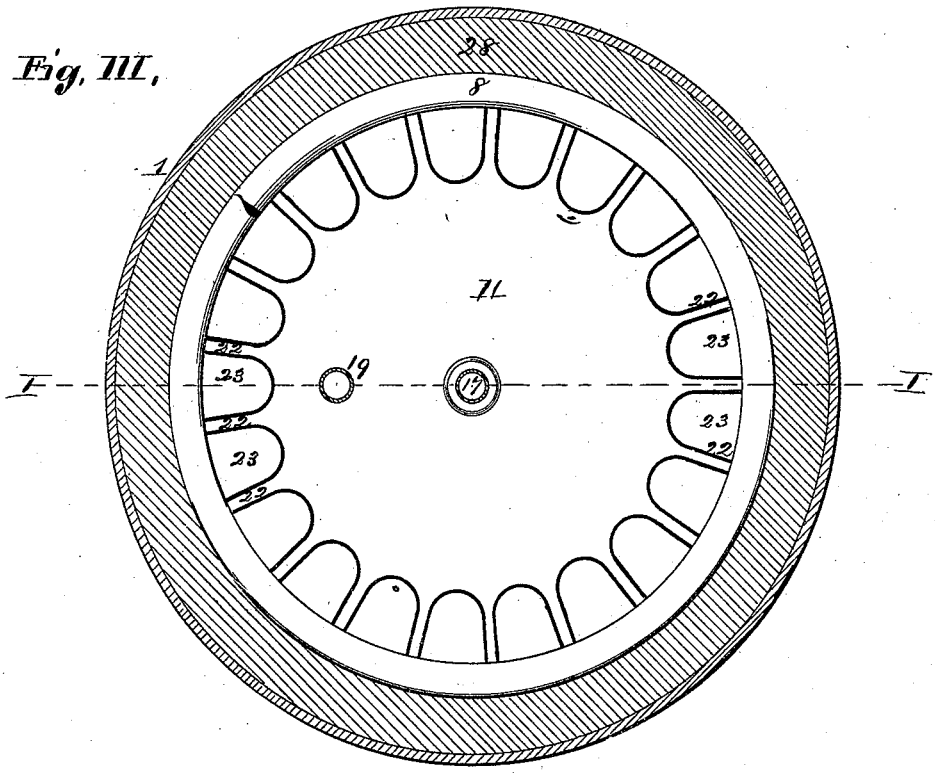
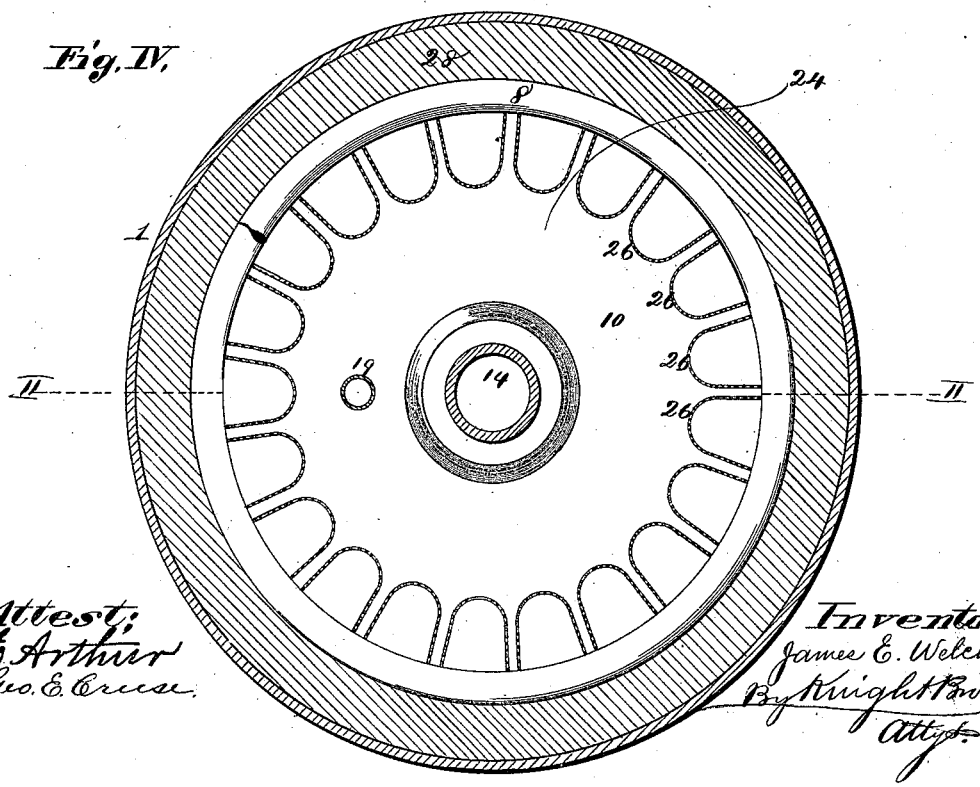


Fig. IV.



Attest:
E. Arthur
Geo. E. Crosa.

Inventor:
James E. Welch.
By Knight Bros.
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JAMES E. WELCH, OF PETERSBURG, ILLINOIS.

WHEAT-HEATER.

SPECIFICATION forming part of Letters Patent No. 421,796, dated February 18, 1890.

Application filed April 22, 1889. Serial No. 308,111. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WELCH, of Petersburg, in the county of Menard and State of Illinois, have invented a certain new and useful Improvement in Wheat-Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This machine is intended for heating, steaming, and drying wheat as a preparation for grinding, but may be used for other grains.

Figure I is an axial vertical section at I I, Fig. III. Fig. II is a side elevation of the fluted cylinder with the steam coil and case in vertical section at II II, Fig. IV. Fig. III is a horizontal section at III III, Fig. I, showing a top view of the upper steam-cylinder. Fig. IV is a horizontal section at IV IV, Fig. I.

1 is a cylindrical case with a cover 2 and a bottom 3. The cover has a central opening 4, in which is fitted a hopper or chute 5, through which the grain is fed to the machine. The bottom 3 has an annular opening or series of openings 6 for the escape of the grain after treatment into a discharge hopper or chute 7.

8 is a steam-coil, in which the pipe is laid so close as to form a cylinder, forming the outer wall of the wheat-passages.

9 and 10 are two steam-cylinders, the former of which has preferably a conical or domed top 11, on which the grain will slip outwardly. The chambers 12 13 of the cylinders are connected by a pipe 14, so that the steam and water of condensation will pass from the upper to the lower chamber. The water may be drawn off through a drain-pipe 15, closed by a valve 16.

17 is a steam-pipe leading from a steam-generator to the upper part of the chamber 12 and having branch pipes 18 and 19. The branch 18 is the upper end of the coil 8. The coil 8 ends at bottom in a discharge-pipe 20, having a valve 21.

22 are curved ribs upon the sides of the cylinders 9 and 10, forming spiral flutes 23, which, with the coil 8, form the passage down which the grain passes, and which it is subjected to the heated coil upon the outside and the heated cylinders upon the inside. The ribs 22 are preferably cast upon the cylinders, so that they may form good conductors of heat, and thus the grain may be heated on every side in its passage through the flutes. It is preferred that the spiral curves of the ribs 22 shall be in an opposite direction upon the two cylinders, so as to reverse the direction in which the grain rolls over in its passage through the flutes. It will be understood that the friction of the wheat will be greater upon the side of the flute upon which it presses by gravity, so that the wheat upon the other side of the flute will move faster, and so a stirring process will be constantly going forward. The rounded coil-pipe 8 will also agitate and mix the grain in its passage through the flutes. Between the cylinders 9 and 10 is a chamber 24, into which the branch steam-pipe 19 discharges. The amount of steam entering this chamber is regulated by a valve 25. The parts of the grain-passages surmounting the chamber 24 are formed of wire-gauze or perforate metal 26 upon the inner sides and by the steam-pipe coil 8 upon the outer side, so that the grain is subjected to the direct action of the steam, which dampens and heats it at the same time. The pipe 19, having its discharge end between the cylinders 12 and 13, above the lower one 13, in this manner, it will be seen that the water of condensation, of which there is always more or less dripping from the pipe 19 and forming in the chamber 24, is again vaporized by the heat from the head of the cylinder 13, and thus prevented from running down the sides of the said cylinder and wetting the wheat. Between the coil 8 and the wall of outer cylindrical case is any suitable non-conducting packing 28 to check the escape of heat.

The operation of the machine is as follows: The grain enters through the hopper or chute 5 and is supposed to keep the passages between the cylinders 9 and 10 and within the wire-work 26 full and constantly descending and having a rolling motion, owing to the inclination of the flues 23, and being otherwise agitated by the unevenness of the coil 8. Thus all the grain is equally subjected to the heating, dampening, and final drying as it passes outside the cylinder 9, the steam-space 24, and the cylinder 10. The speed of passage of the grain through the machine may be regulated by a valve or valves 27 in connec-

tion with the hopper or chute 7 or by other means.

I claim as my invention—

1. In a wheat-heater, the combination, with the steam-cylinders having the upwardly-extending ribs and an inclosing steam-coil fitting around said cylinders and ribs, of the chamber 24 between said cylinders, and the steam-pipe 19, discharging into said chamber above the lower cylinder, substantially as and for the purposes set forth.

2. The two steam-cylinders having the upwardly-extending radial ribs 22, the cylindrical coil 8, fitting the edges of the ribs, a steam-chamber 24 between the cylinders, and wire-work 26, forming with the coil 8 passages outside the chamber 24, substantially as set forth.

3. The combination, in a wheat-heater, of a steam-cylinder 9, having projecting upwardly-extending spiral ribs 22, the steam-cylinder 10 below and connected to the cylinder 9 and having similar ribs, but winding in the opposite direction to the ribs of cylinder 9, a surrounding cylinder 8, composed of a steam-coil fitting the edges of the spiral ribs and forming with them and the cylinder inclined passages for the grain, substantially as set forth.

4. The combination, in a wheat-heater, of the two spirally-ribbed steam-cylinders, with a steam-chamber 24 between them and the pervious conductors 26, all constructed and adapted to operate substantially as set forth.

5. The combination of steam-cylinders 9 and 10 with radial ribs 22, the steam-chamber 24 between the cylinders, the pervious conductors 26, connecting the ribs of the cylinders, the surrounding steam-coil 8, and non-conducting jacket 28, substantially as set forth.

JAMES E. WELCH.

Witnesses:
SAML. KNIGHT,
EDW. S. KNIGHT.