

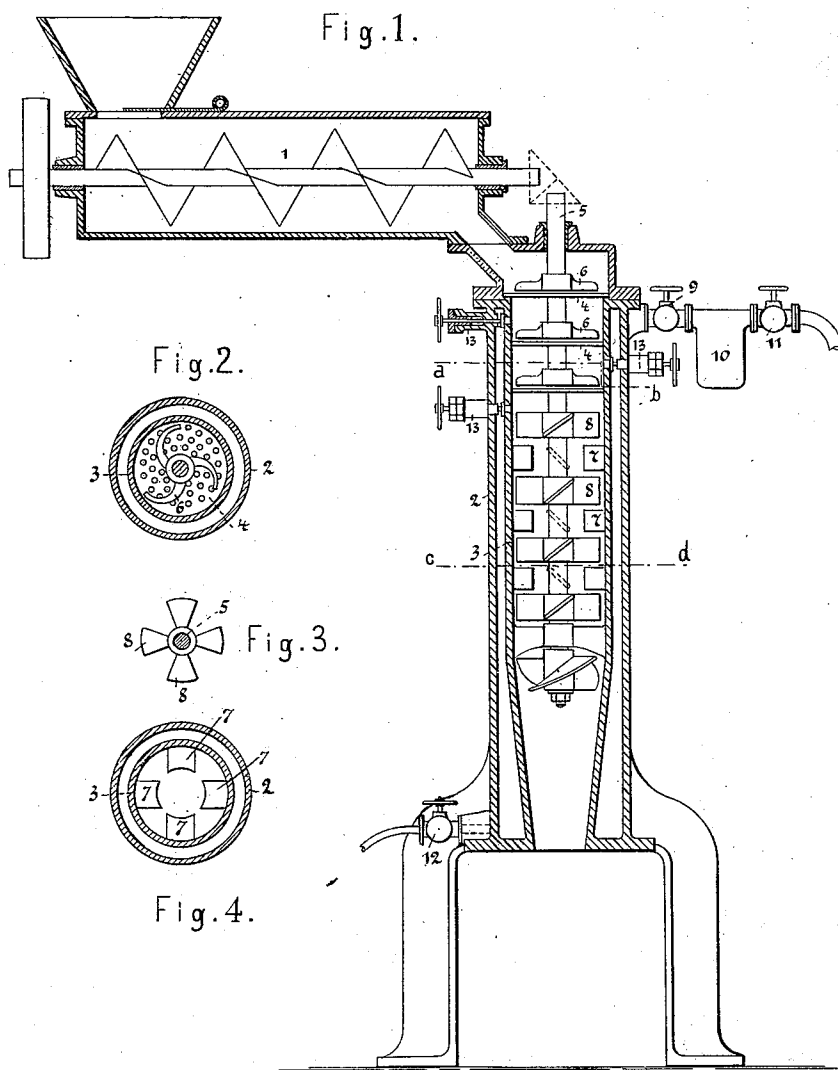
(No Model.)

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APPARATUS FOR HEATING AND STEAMING COMMINUTED MATERIALS.

No. 393,023.

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AUGUST CHRISTIAN NAGEL, REINHOLD HERMANN KAEMP, AND ADOLF WILHELM FRANZ GEORG LINNENBRÜGGE, OF HAMBURG, GERMANY.

APPARATUS FOR HEATING AND STEAMING COMMINUTED MATERIALS.

SPECIFICATION forming part of Letters Patent No. 393,023, dated November 20, 1888.

Application filed September 20, 1887. Serial No. 250,196. (No model.) Patented in Germany December 18, 1886, No. 40,694.

To all whom it may concern:

Be it known that we, AUGUST CHRISTIAN NAGEL, REINHOLD HERMANN KAEMP, and ADOLF WILHELM FRANZ GEORG LINNENBRÜGGE, all three citizens of the free State of Hamburg, and residing in Hamburg, German Empire, have invented new and useful Improvements in Apparatuses for Heating and Steaming Comminuted Materials, (for which we have obtained Letters Patent in Germany, No. 40,694, dated December 18, 1886,) of which the following is a specification.

The object of our invention is to heat and steam bran, crushed grain, and other comminuted materials containing glutinous matter, in view of rendering them fit to be compressed into cakes. For this purpose we employ an apparatus consisting in a vertical cylinder provided with means for heating the same by steam and for admitting steam thereinto, in combination with devices whereby the material introduced into the cylinder is caused to drop downward in dispersed state and to be retarded and at the same time stirred during its descent, so that it will become uniformly heated and impregnated with steam.

On the annexed sheet of drawings this apparatus is represented by Figure 1 in vertical section. Fig. 2 is a horizontal section on line *a b*. Fig. 3 is a top view of a part in detail, and Fig. 4 a horizontal section on line *c d*.

The aforesaid cylinder, marked in the drawings by the numeral 3, is surrounded by a jacket, 2, connected at the top to a steam-supply pipe provided with the admission-valve 11, and, by preference, in addition thereto with a pot, 10, for collecting water of condensation, and an automatic pressure-regulator, 9.

12 is a valve for drawing off the water condensing within the jacket, and 13 are valves for admitting steam from the jacket into the cylinder.

The material to be treated is fed to the cyl-

inder by means of a screw-conveyer, 1, or in other suitable manner. In the upper portion of the cylinder are arranged the horizontal perforated partition-plates 4, the number whereof is variable, and in the center of the cylinder is mounted the shaft 5, carrying above each of the plates 4 the stirrers 6. Below the said plates are fixed to the wall of the cylinder the inclined blades 7, while in the spaces between the latter the shaft 5 is provided with blades 8, which are inclined in a direction contrary to the inclination of the blades 7. When the shaft 5, which is driven by any suitable gearing, is put in rotation, the material introduced into the cylinder at the top will be pushed by the stirrers 6 through the perforations of the plates 4, whereupon it drops in dispersed state on the blades 7 and 8, which cause it to slide slowly downward in alternate directions and at the same time keep it in commotion. The apparatus being supplied with steam while the material is descending the glutinous substances contained in the latter will be softened by the steam, so that if the material is thereupon exposed to pressure in a suitable press solid cakes may be formed out of the same.

In some cases the blades 7 and 8 may be dispensed with, and, if should be preferred, the valves 13 may be kept closed, so that the material will then be warmed only.

We claim as our invention—

1. The combination, with the cylinder 3, provided with means for feeding the same with comminuted materials and for admitting steam thereto, of a jacket, 2, connected to a steam-supply pipe, one or more stationary horizontal perforated partition-plates, 4, and one or more rotating stirrers, 6, substantially as and for the purpose specified.

2. The combination, with the cylinder 3 and jacket 2, connected to a steam-supply pipe, of a valve or valves, 13, for establishing communication between the jacket and the cylinder, and one or more stationary horizontal perforated partition-plates, 4, and stirrers

6, substantially as and for the purpose described.

3. The combination, with the cylinder 3, jacket 2, connected to a steam-pipe, a valve
5 or valves, 13, and one or more stationary horizontal perforated partition-plates, 4, and stirrers 6, of the fixed inclined blades 7 and the rotating inclined blades 8, substantially as set forth, and for the purpose specified.

10 In testimony whereof we have hereunto set

our hands in the presence of two subscribing witnesses.

AUGUST CHRISTIAN NAGEL.
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ADOLF WILHELM FRANZ GEORG
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Witnesses:

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