(No Model.)

3 Sheets—Sheet 1.

R. F. L. PLÖNNIS.

GRAIN DRIER.

No. 310,080. Patented Dec. 30, 1884.

Fig. 1.

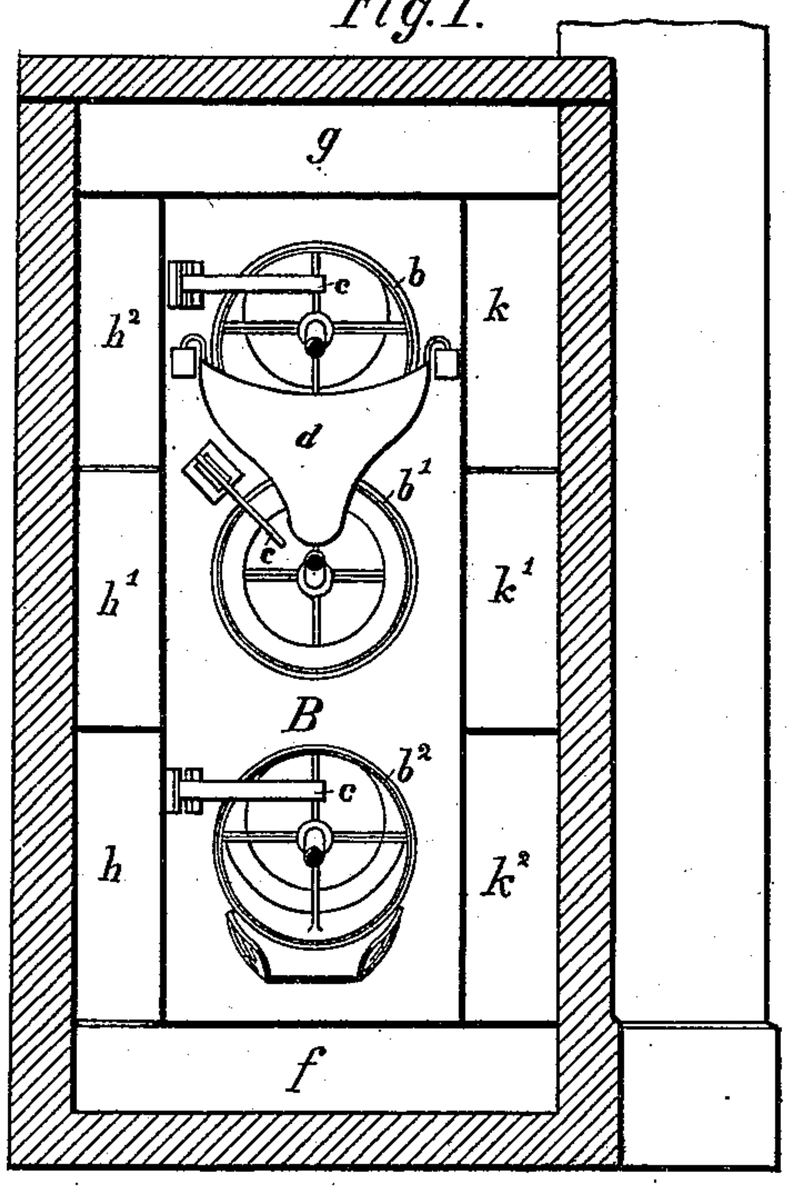
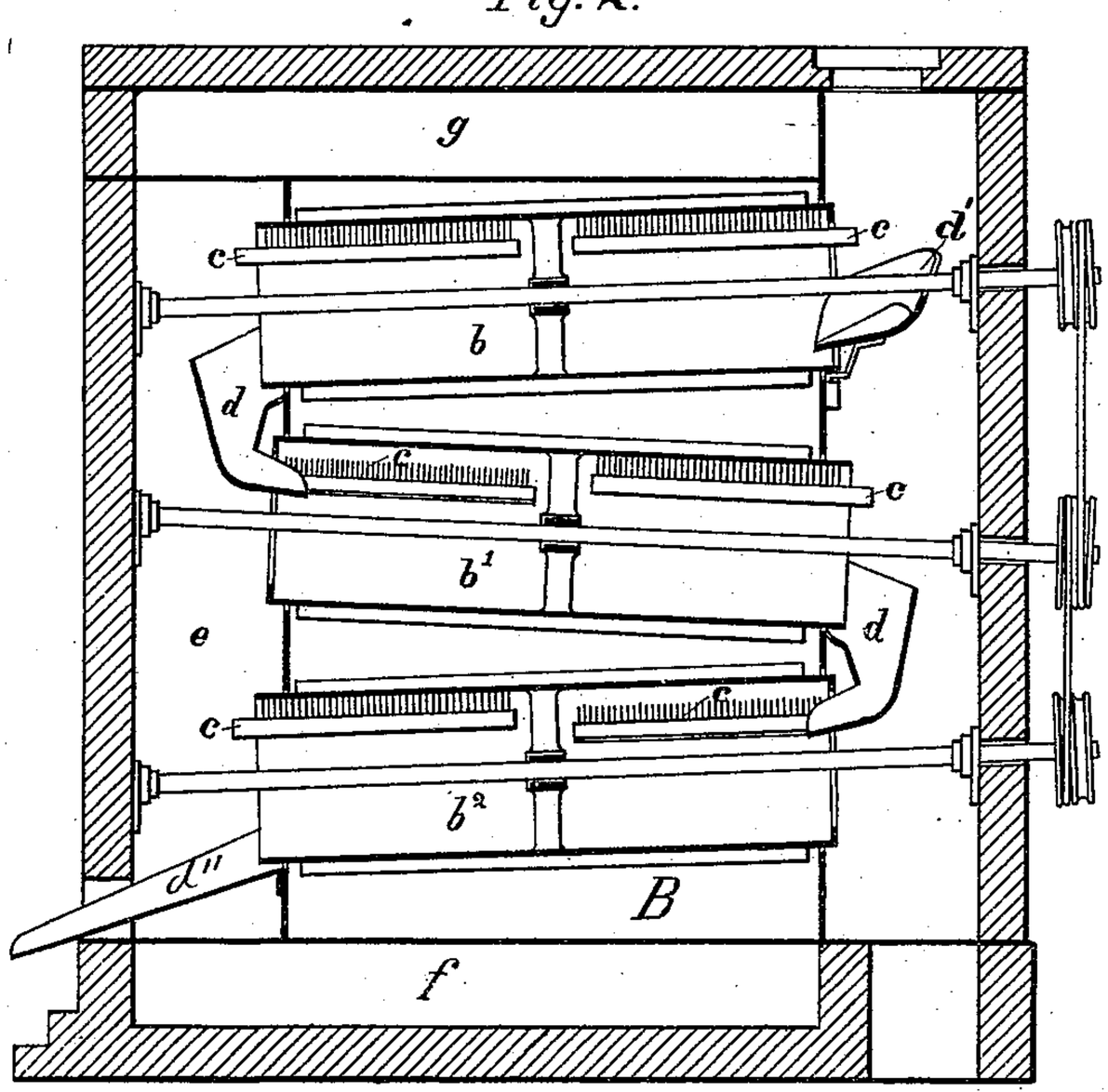


Fig. 2.



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By Paine Lad,
Att'ys.

(No Model.) 3 Sheets—Sheet 2.

R. F. L. PLÖNNIS.

GRAIN DRIER.

No. 310,080. Patented Dec. 30, 1884.

Fig. 3.

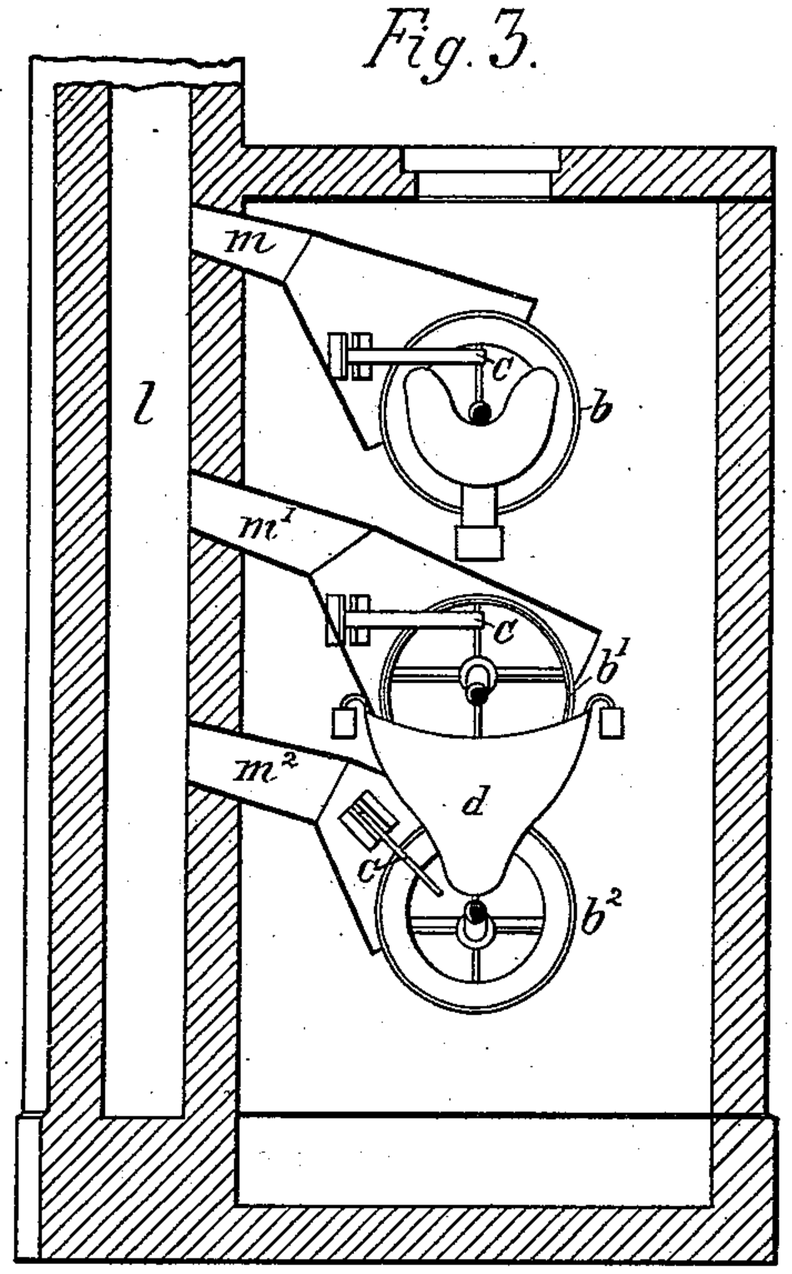
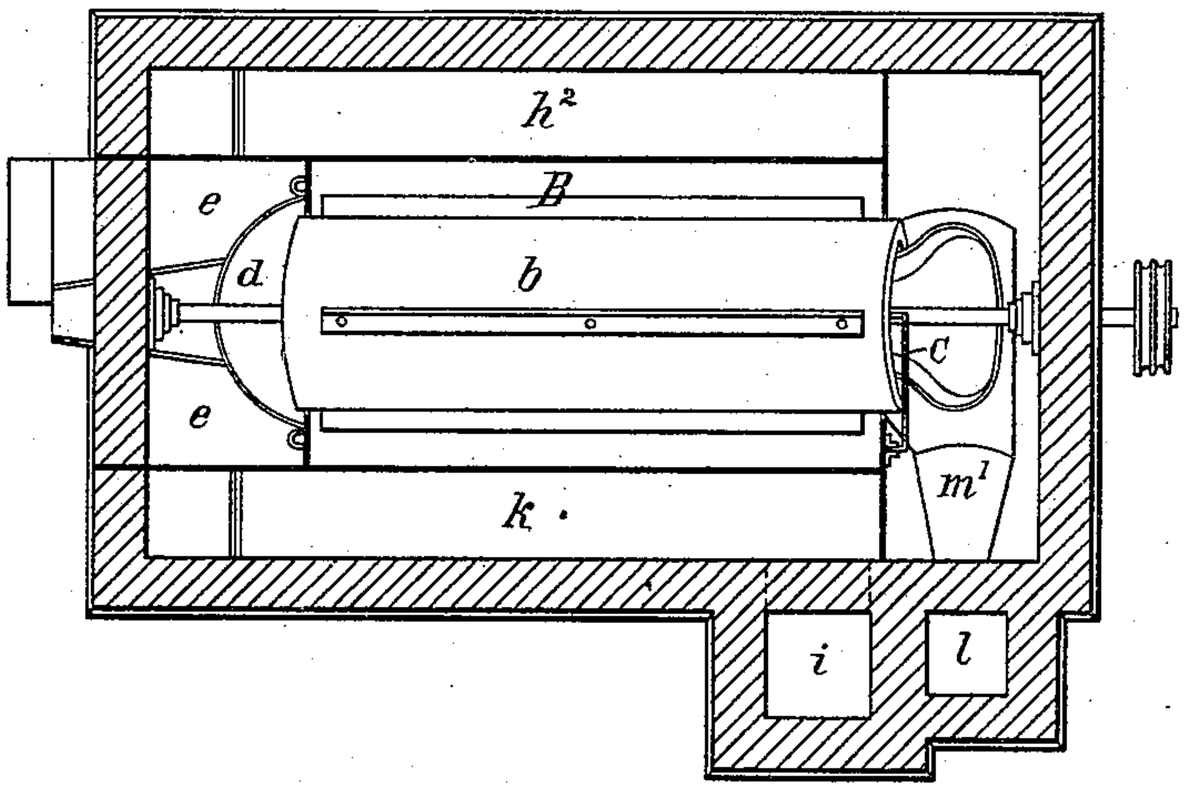


Fig. 4.



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(No Model.)

3 Sheets—Sheet 3.

R. F. L. PLÖNNIS.

GRAIN DRIER.

No. 310,080. Patented Dec. 30, 1884.

Fig. 5.

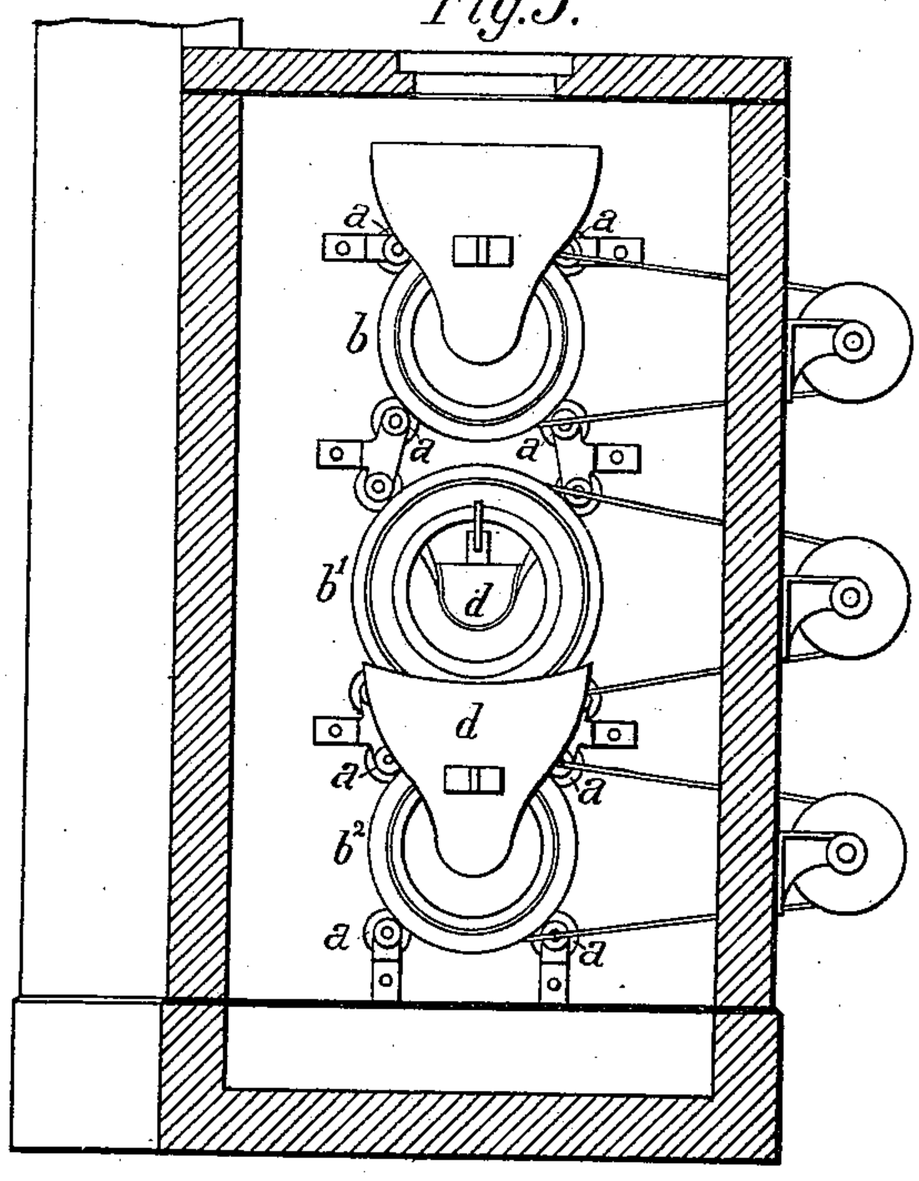
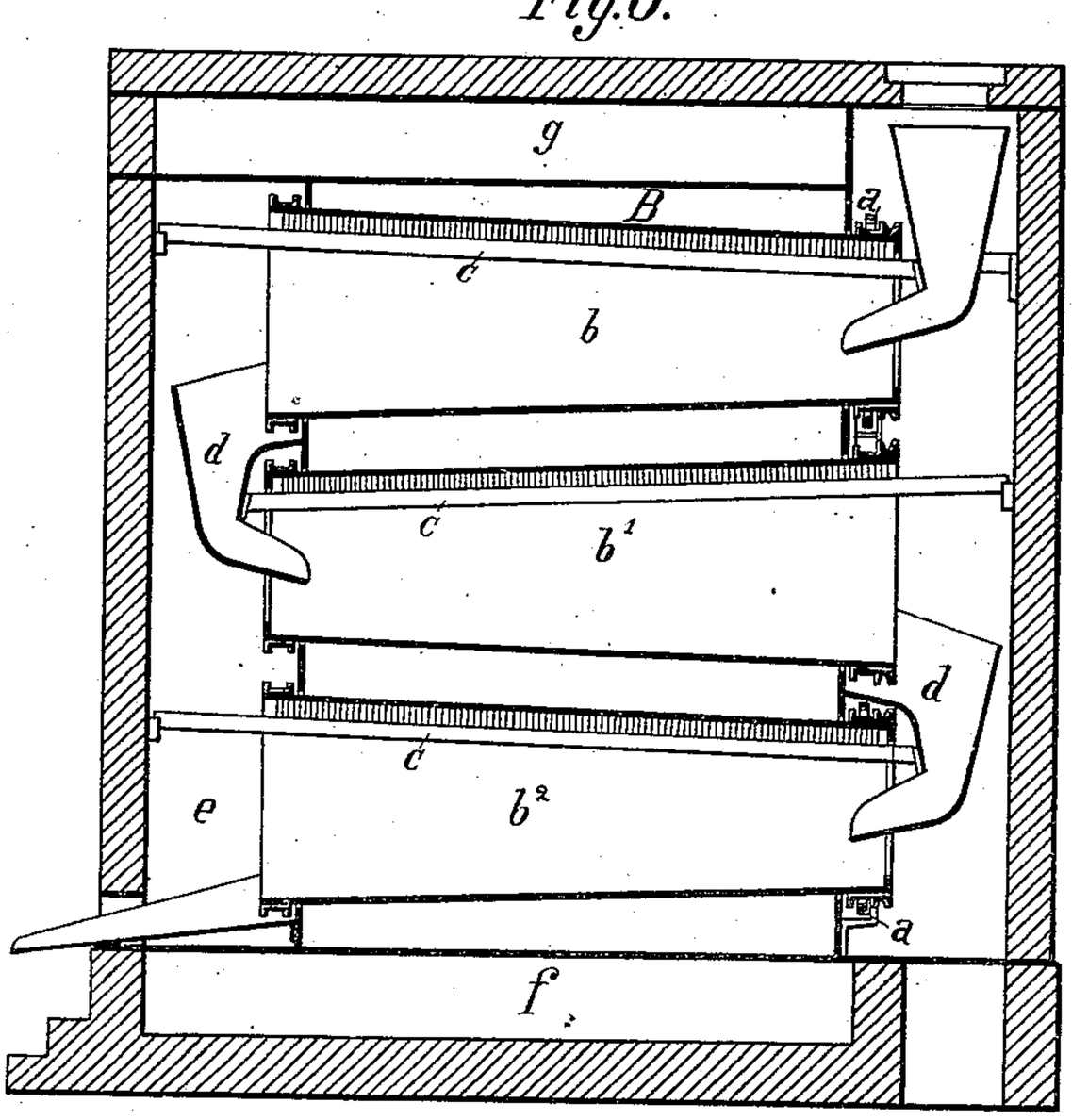


Fig. 6.



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UNITED STATES PATENT OFFICE.

RUDOLF FRIEDRICH LUDWIG PLÖNNIS, OF BÜDELSDORF, GERMANY.

GRAIN-DRIER.

SPECIFICATION forming part of Letters Patent No. 310,080, dated December 30, 1884.

Application filed May 13, 1884. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF FRIEDRICH LUDWIG PLÖNNIS, doctor in philosophy, a subject of the Emperor of Germany, and a resident of Büdelsdorf, in the German Empire, have invented certain new and useful Improvements in Apparatus for Drying Damp Grain, Returns, and other like Substances, of which the following is a specification.

My invention relates to the class of grain-driers which employ revolving cylinders, through which the grain passes successively in opposite directions; and the invention consists of the improved apparatus hereinafter described and claimed.

Two modifications of my invention are illustrated in the accompanying drawings, in which Figure 1 is a front view of an apparatus with inclined cylinders. Fig. 2 is a side elevation thereof. Fig. 3 is a back view, and Fig. 4 a top view, all partly in section. Fig. 5 is a back view, and Fig. 6 a side elevation, both partly in section, of an apparatus with conical drums.

Similar letters refer to similar parts throughout the several views.

The several grain-drums are arranged, one above another, in the same vertical plane, and they are either made cylindrical, with their axes inclined, as shown in Figs. 1 to 4, or of a conical shape, with their axes horizontal, as shown in Figs. 5 and 6. In both cases they are placed in such a manner that each of the upper drums will discharge into the next lower drum. The upper drum, *b*, is charged, by means of an elevator or other suitable conveying mechanism, with the grain or other material to be dried, the same being delivered by means of the chute *d'* into the drum. As the grain issues from each drum it is conveyed, by means of the hopper-chutes *d*, into the next lower drum, and finally issues through the chute *d''* in the usual way. Within each drum there is a brush, *c*, preferably made of wire and placed at the top of the drum, which cleans the inner surface of the drum and removes any grain that may adhere thereto. In order to suspend these brushes within the drum, the latter may either be connected with its shaft by ribs located at the middle of the drum only, as shown in Figs. 1 to 4, and the ends of the drum supported also by outside rollers, or the entire drum may be supported on outside anti-friction rollers, *a*, Figs. 5 and 6. In the former case the arms supporting the brushes *c* are attached to the walls of the drier outside of the drums, and are bent round into their proper positions within the drums. In the latter case the brushes are carried by straight rods extending through the drums, and the same are supported at their ends by the end wall of the drier and the spouts *d*. The drums are rotated either by pulleys or geared wheels carried by their shafts, or by means of driving belts, straps, chains, or other means applied directly to the drums, or by means of geared rings attached thereto. The drums are placed inside of a box, B, which is heated on all sides by hot air, and the ends of the drums pass through the front and rear walls of the box. The hot-air chambers at the side of the drum-box are divided by horizontal partitions into several divisions, $h\ h'\ h^2$ and $k\ k'\ k^2$, communicating passages being left through the horizontal partition between adjacent divisions at one end of each partition; but these openings alternate with each other, so that the hot air in ascending or descending through the chambers must take a zigzag course. The hot air, supplied in any suitable manner, passes at first into the chamber *f* beneath the box B. It then ascends in a zigzag course through the chambers $h\ h'\ h^2$ to the chamber *g* at the top of the box B, and descends in like manner through the zigzag chambers $k\ k'\ k^2$ to the chimney-exit *i*. The front chamber, *e*, is also heated, though the rear chamber at the opposite end of the drums is not; consequently a strong current of air passes through the drums from front to rear and is conveyed through the passages $m\ m'\ m^2$ into the chimney *l*, carrying off the vapor and moisture from the damp grain. An exhaust-fan may be placed within the chimney *l*, above the opening from the top drum, to secure a steady current of air through the drums.

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

1. In a grain-drier, a series of revolving drums arranged one above another, and inclined, so that the grain travels through successive drums in opposite directions, with chutes for conveying the grain from each drum into the next lower drum, in combination with

a series of hot-air chambers inclosing the drums, said chambers having communicating passages which alternate with each other, so that the air travels in a zigzag course around the drums, substantially as and for the purpose set forth.

2. In a grain-drier, a revolving drum through which the grain passes, in combination with a brush suspended from the walls of the machine and bearing against the interior surface of the drum at the top thereof, substantially as and for the purpose set forth.

3. In a grain-drier, a revolving drum attached to its shaft by ribs placed at the middle of the drum, in combination with brushes supported by the walls of the machine, which project into the interior of the drum through the open ends thereof, substantially as and for the purpose set forth.

4. In a grain-drier, a series of revolving drums arranged one above another, and inclined, so that the grain travels through successive drums in opposite directions, with chutes for conveying the grain from each drum into the next lower drum, in combination with a series of hot-air chambers inclosing the drums at the bottom, sides, and top, said chambers having communicating passages which alternate with each other, so that the air travels in a zigzag course around the drums, and a hot-air chamber at the front end of the drums communicating through the drums with passages leading to an exit chimney or flue at the rear end of the drums, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 21st day of April, 1884.

RUDOLF FRIEDRICH LUDWIG PLÖNNIS.

Witnesses:

DIEDRICH PETERSEN,

E. HAASE.