No. 640,319. Patented Jan. 2, 1900.

F. G. PERKINS.

DRYING KILN.

(Application filed Apr. 5, 1897.)

(No Model.) 2 Sheets—Sheet 1.

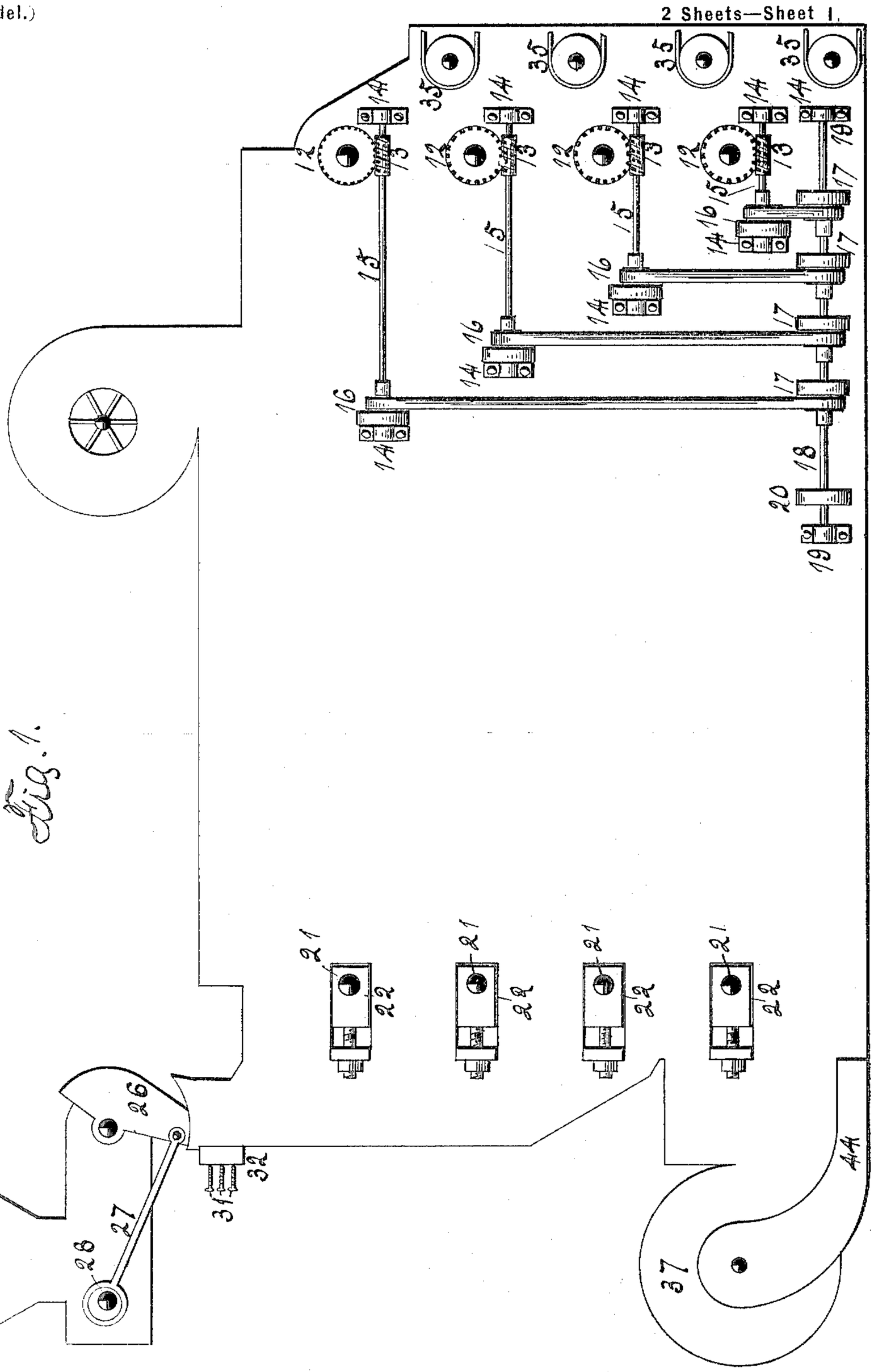

Fig. 1.

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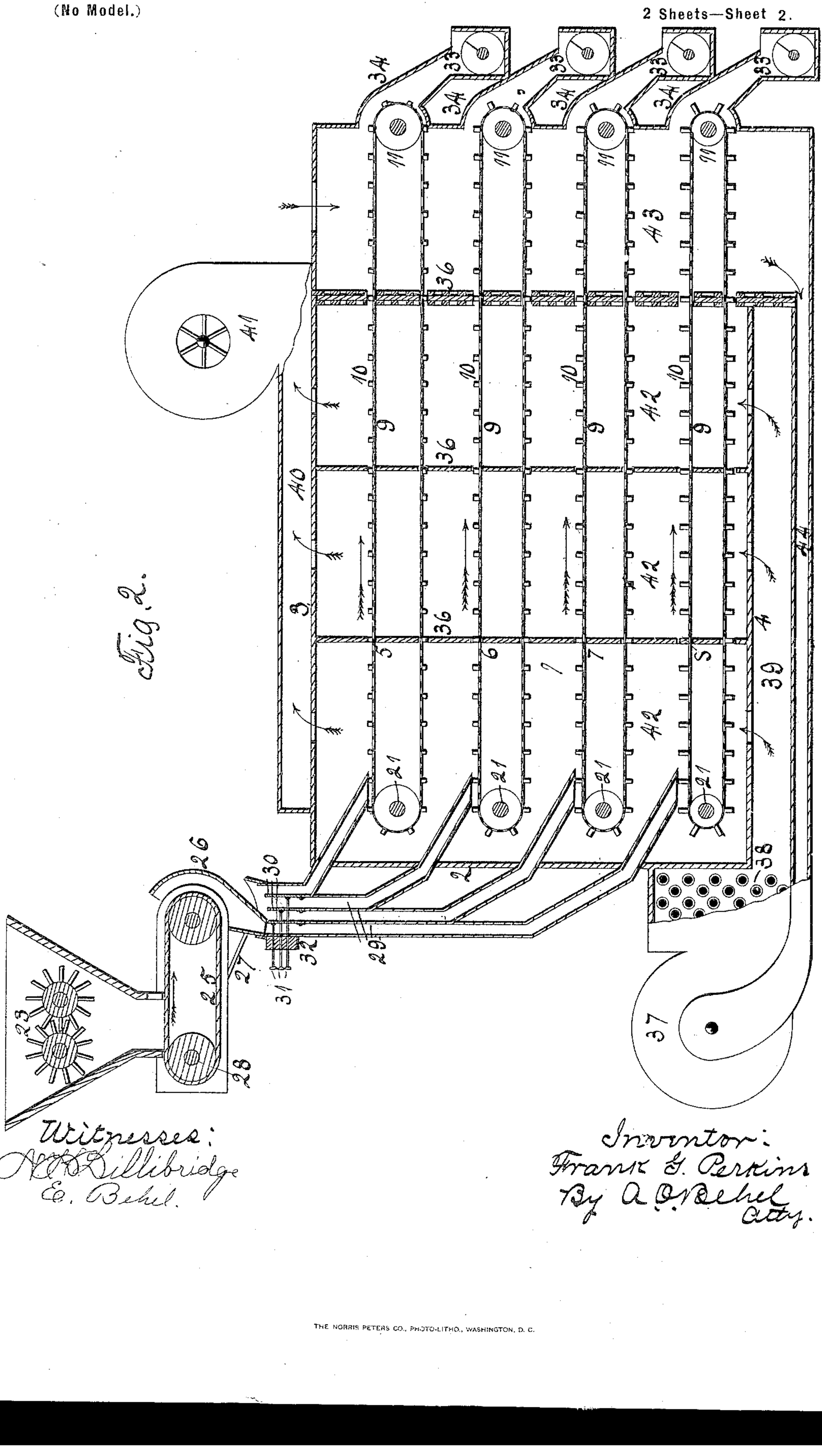

Fig. 2.

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UNITED STATES PATENT OFFICE.

FRANK G. PERKINS, OF CHICAGO, ILLINOIS.

DRYING-KILN.

SPECIFICATION forming part of Letters Patent No. 640,319, dated January 2, 1900.

Application filed April 5, 1897. Serial No. 630,770. (No model.)

To all whom it may concern:

Be it known that I, FRANK G. PERKINS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Drying-Kilns, of which the following is a specification.

The object of this invention is to construct a kiln especially for drying starch in which the starch turned out will be of a given moisture or can be varied so that different portions contain different moistures.

In the accompanying drawings, Figure 1 is a side elevation of my improved kiln. Fig. 2 is a lengthwise vertical central section.

The kiln is composed of the sides 1, end 2, top 3, and bottom 4, suitably joined. Within the kiln are located endless carriers 5, 6, 7, and 8, extending the length of the kiln and superimposed. The carriers consist of a perforated apron 9 and cleats 10, extending transversely of the apron, equidistant apart. The cleats are located upon the upper surface of the apron, the cleats of the lower carrier being the highest and those of the carriers above diminishing in height. The rollers 11, supporting the aprons, have trunnions extending through the sides of the kiln, and one trunnion of each roller supports a worm-wheel 12. Each worm-wheel is driven by engagement with a worm 13, keyed to its shaft 15, which is supported in suitable bearings 14, and to each shaft is secured a cone-pulley 16, and the cone-pulleys 16 of each shaft have a belt connection with cone-pulleys 17, secured to a common driving-shaft 18, supported in bearings 19. A pulley 20 is connected to the driving-shaft and is driven from a prime mover.

The shafts 21, supporting the head end of the aprons, are supported in movable boxes 22 for taking up the slack in the aprons.

A starch-breaker is suitably supported above the kiln, and beneath which is located an endless feed-apron 25, movable in the direction indicated by the arrow and held supported in a frame. A hood 26 has a pivotal connection with the frame supporting the feeding-apron and is oscillated upon its pivotal connection with the frame supporting the feed-apron. To the hood is connected a rod 27, which has an eccentric connection with the shaft 28 of the feed-apron, by means of which an oscillatory movement is imparted to the hood. At the discharge end of the hood is located a series of spouts 29, one leading to each endless carrier, the upper section 30 of the center partition being hinge-jointed, and rods 31, extending through the support 32, form the means for moving the sections. At the discharge end of each of the endless carriers is located a screw conveyer 33, extending transversely of the kiln, and a spout 34 directs the dried material from the carriers to the screw conveyers by which it is conveyed to the place of discharge. The screw conveyers are driven by belt connection with the pulleys 35. The kiln is divided into several compartments by vertical partitions 36, in this instance forming three hot-air compartments 42 and a cooling-compartment 43. Beneath the kiln is located a hot-air duct 39, which communicates with each of the hot-air compartments, and a blast-fan 37 forces the air through the heater 38 into the compartment. The top of the kiln is formed with a duct 40, to which is connected an exhaust-fan 41. The air-supply to the blast-fan passes downward through the cooling-compartment of the kiln and by the duct 44 to the eye of the fan. The various movable parts are set in motion, and the table-starch is thrown into the breaker, where it is broken up and dropped onto the endless feed-apron 25, from which it is discharged into the oscillating hood 26, which distributes the starch into the different chutes which discharge it onto the series of endless carriers, and after being dried by passing through the hot-air chambers and through the cold-air chamber is discharged into the screw conveyers and carried to the place of deposit.

As a given quantity of starch is distributed by the hood with each oscillation, it is necessary that it be divided between the endless carriers, so that each carrier will receive its quota in proportion to the drying capacity of the heat passing through the carriers. As the heat in passing through the first carrier loses some of its absorbing capacity, a less quantity of starch should be placed upon the next carrier above it, and so on through the series, providing all of the carriers are being moved at the same speed; but if moved at different speeds an equal layer of starch may be placed

upon each carrier. By placing an equal layer of starch upon each carrier and moving them at the same speed each carrier will deliver starch of different moistures, which is often desired, and it is within the capacity of the kiln to deliver starch of a uniform degree of moisture or different degrees, according to the thickness of starch upon the carriers or the speed at which they are moved. It is also desirable that the starch be cooled if for immediate shipment, and especially if packed in wooden barrels, as the heat would shrink the staves, causing the barrels to fall to pieces, and this cooling process is accomplished by causing the endless carriers to pass through the cooling-compartment.

By having a common feeding device for the series of carriers the proper amount of starch can be delivered to each carrier according to the quality of dried starch produced.

I claim as my invention—

1. In a drying-kiln, the combination of a series of carriers, a series of supply-inlets to the carriers and a single feeding device to the inlets.

2. In a drying-kiln, the combination of a series of carriers, a series of supply-inlets to the carriers, a series of discharge-outlets from the carriers and a single feeding device to the inlets.

3. In a drying-kiln, the combination of a series of carriers, a series of supply-inlets to the carriers, a feeding device to the inlets and a distributer located between the feeding device and inlets.

4. In a drying-kiln, the combination of a series of carriers, a series of supply-inlets to the carriers, a feeding device to the inlets and an oscillatory distributer between the feeding device and inlets.

5. In a drying-kiln, the combination of a series of carriers, a series of supply-inlets to the carriers, and a distributer adapted to distribute the material between the supply-inlets.

6. In a drying-kiln, the combination of a series of carriers, a series of supply-inlets to the carriers, and a distributer for the inlets, so constructed and arranged that the amount of material fed to each inlet can be varied and adjusted.

7. In a drying-kiln, the combination of a series of carriers, a series of supply-inlets to the carriers, provided with adjustable openings and a distributer adapted to distribute the material between the supply-inlets.

8. In a drying-kiln, the combination of a series of carriers adapted to be moved at different rates of speed, and a series of supply-inlets to the carriers, substantially as set forth.

9. In a drying-kiln, the combination of a series of carriers adapted to be moved at different rates of speed, and a series of supply-inlets to the carriers, and a distributer adapted to distribute the material between the supply-inlets, substantially as set forth.

10. In a drying-kiln, the combination of a series of carriers adapted to be moved at different rates of speed, and a series of supply-inlets to the carriers, and a distributer adapted to distribute the material between the supply-inlets, so constructed and arranged that the amount of material fed to each inlet can be varied and adjusted, substantially as set forth.

11. In a drying-kiln, the combination of a series of superimposed carriers, cleats on the carriers, the cleats on the lowest carrier being the highest, and those of the upper carriers diminishing in height, and a series of supply-inlets to the carriers, substantially as set forth.

12. In a drying-kiln, the combination of a series of superimposed carriers, cleats on the carriers, the cleats on the lowest carrier being the highest, and those of the upper carriers diminishing in height, and a series of adjustable supply-inlets to the carriers, and a distributer adapted to distribute the material between the supply-inlets, substantially as set forth.

13. In a drying-kiln, the combination of a series of carriers provided with cleats 10, the inlet-spouts 29, provided with adjustable sections 30, the feed-apron 25, the oscillating distributer 26, the outlet-passages 34, and means for forcing heated air against the carriers, substantially as set forth.

14. In a drying-kiln, the combination of a series of carriers, rollers 11, supporting the carriers, the worm-wheel 12, attached to one of the rollers, the worm 13, the shaft 15, the pulleys 16, and 17, the driving-shaft 18, the inlet-spouts 29, provided with adjustable sections 30, the feed-apron 25, the distributer 26, the outlet-passages 34, and means for forcing heated air against the carriers, substantially as set forth.

FRANK G. PERKINS.

Witnesses:
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