(No Model.)

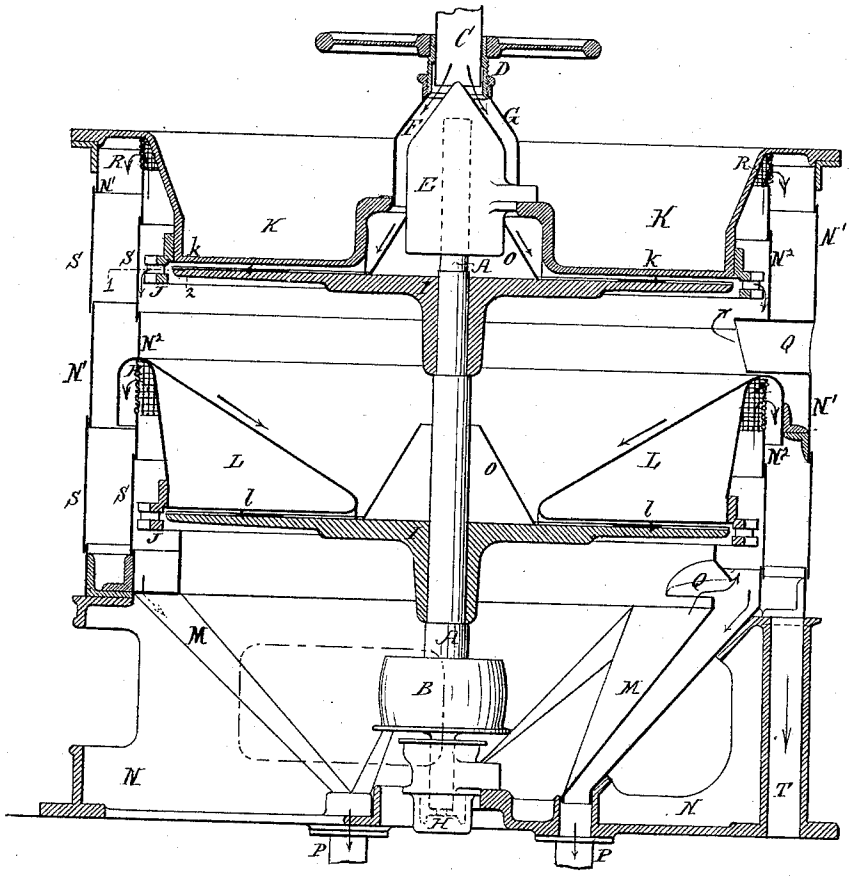
2 Sheets—Sheet 1.

H. F. SAINT REQUIER.

APPARATUS FOR THE REDUCTION OF GRAIN.

No. 277,790. Patented May 15, 1883.

FIG. 1.



Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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FIG. 2.

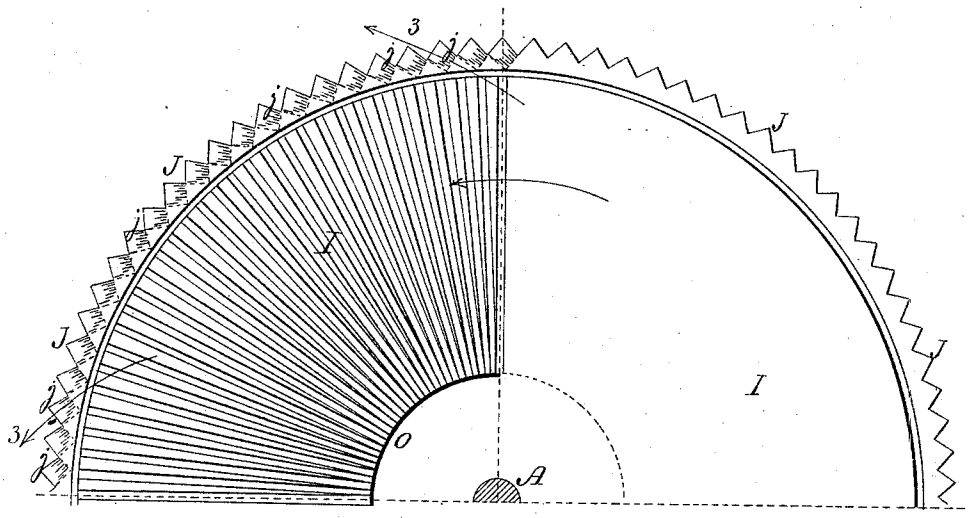
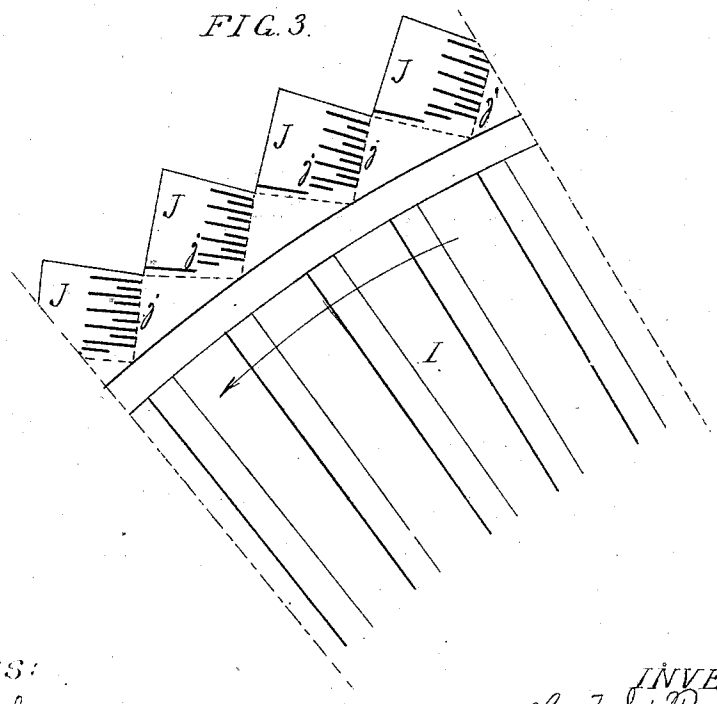


FIG. 3.



WITNESSES:
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UNITED STATES PATENT OFFICE.

HENRY F. SAINT REQUIER, OF ASNIERES, FRANCE.

APPARATUS FOR THE REDUCTION OF GRAIN.

SPECIFICATION forming part of Letters Patent No. 277,790, dated May 15, 1883.

Application filed April 3, 1882. (No model.) Patented in France February 1, 1882, No. 147,163; in Belgium February 3, 1882, No. 56,958, and in England February 3, 1882, No. 533.

To all whom it may concern:

Be it known that I, HENRY FERDINAND SAINT REQUIER, engineer, a citizen of the Republic of France, residing in Asnieres, (Seine,) France, have invented Improvements in Apparatus for the Reduction of Grain, of which the following is a specification.

My invention consists of certain improvements in reducing grain and in apparatus therefor, as more fully described hereinafter.

In the accompanying drawings, Figure 1 is a vertical section of my improved machine for reducing grain; Fig. 2, a sectional plan of a portion of one of the rotating tables or disks and knife-rings, only a quarter-segment being illustrated in detail; and Fig. 3 is an enlarged sectional plan view on the line 1 2, Fig. 1, of a portion of a table and knife-ring.

The base-frame N of the machine carries an inner and outer casing, N′ and N², on which is mounted the stationary cap K. The said base-frame also has at the center a step-bearing, H, in which is mounted the lower ends of the vertical shaft A, carrying a driving-pulley, B, and two horizontal disks or tables, I I. The upper end of the shaft A turns in a bearing, E, carried by the cap K. Each disk I has formed on its upper surface a series of radial grooves, Fig. 2, having parallel walls, and of a size proportioned to the size of the grain to be reduced. The upper surface of each disk is provided at its center with conical sheet-metal deflectors O, to direct the grain onto the grooved surfaces of the disks I. The cap K has an annular depression, *k*, so as to bring its under surface horizontally in close proximity to the grooved surface of the upper disk I, and the fixed conical hopper L, which directs the grain onto the lower disk, has a horizontal under surface, *l*, in close proximity to the grooved surface of the said lower disk I.

To the periphery of the depressed portion *k* of the cap K are secured the knife-rings J J, carrying a series of fine steel blades, *j*, arranged in a series of step-like sets around the periphery of the disks, as shown in Figs. 2 and 3. These blades present their vertical cutting-edges to the grain, and are arranged in planes at such an angle to the radial lines from the center of the shaft A as to be about on the lines of movement taken by the grain thrown off by the rapidly-revolving disk, when the latter rotates in the direction of the arrow, Fig. 3. The spaces between each set of blades and between the blades of each set are such as to permit the cut grain to pass between them, and the blades of each set slightly radiate outward, as shown in Fig. 3, so as to prevent liability to clogging, and the blades are made of different lengths for the same purpose. Similar knife-rings J, with their sets of blades, are carried by the lower outer edge of the hopper L on a line with the periphery of the lower disk I, the blades in these lower rings being preferably arranged closer together than in the upper rings.

The upper part of the bearing E is conical, and over this is fitted a conical cover, G, leaving an annular channel, F, for the passage of the grain onto the upper disk I from the feed-spout C. This feed-spout is provided with a tubular screw-gate or slide, D, to regulate the amount of grain supplied to the apparatus.

The lower part of the apparatus below the lower disk I is provided with a series of tapering discharge-spouts, M, which carry the reduced grain to the delivery-pipes P P.

At suitable points in the casing are air-inlet openings Q, two being shown in the drawings, one in communication with the upper half and the other in communication with the lower half of the apparatus. The interior of each half of the apparatus communicates through perforations or wire-gauze screens R in the inner casing, N², with the space between the latter and the outer casing, and this space is in communication with a suction apparatus through an outlet, T.

The grain fed into the apparatus through the feed-spout C passes onto the upper grooved disk I, which rotates rapidly, (preferably at from twelve hundred to fifteen hundred revolutions a minute.) The grain is guided and directed by the radial grooves, and is projected with great force directly against the cutting-edges of the blades *j*, as indicated by the arrows 3 3 in Fig. 2. The grain thus cut up, after escaping between the blades, falls down

into the hopper L, and thence onto the lower revolving disk I, by which it is again thrown off by the centrifugal force and violently projected against the cutting-edges of the finer set of blades, and the grain thus further reduced then passes out through the spouts M and pipes P. Meanwhile the currents of air drawn in through the openings Q carry off the lighter particles to the screens R, which prevent the pieces of cut grain from escaping, but permit the passage of the dust and light bran, these latter being carried by the suction-fan through the outlet T to a chamber for their reception. I prefer to provide the inner and outer casings, N' N², with sliding doors S S, to allow of ready access to the knives and rotating disks.

I am aware that grain-reducing machines have heretofore been constructed with rotating grooved or notched disks, combined with knives around the periphery of the disk; but in such machines the knives have been arranged practically in contact with the periphery of the disk, so as to act, in conjunction with the edges of the notches, to cut the grains with a shearing action. In my machine the grain is thrown off from the disk, and is cut simply by being forcibly projected against the edges of the fine steel blades, which are set back from the revolving disk and are spaced from each other to permit the grain to pass between the blades.

I claim as my invention—

1. The combination of the revolving grooved disk of a grain-reducing machine, with knife-rings around the periphery thereof, carrying a number of fine steel blades set back from the disk to permit the grain to be forcibly projected against the knives and cut by impact and leaving free spaces between the blades to permit the cut grain to pass between them, substantially as described.

2. The combination of the revolving grooved disk of a grain-reducing machine, with fine cutting-blades around the periphery thereof, arranged in step-like sets, each set at an angle in respect to a radial line from the center of the disk, substantially as set forth.

3. The combination of the revolving grooved disk of a grain-reducing machine, with a series of fine cutting-blades around the periphery thereof in sets, the blades of each set radiating outward, and having free spaces between them to facilitate the passage of the cut grain between them and prevent clogging, substantially as specified.

4. The combination of the casing and its cap K, carrying an upper bearing, E, with rotating shaft and step-bearing.

5. The combination of rotating shaft and upper bearing, E, having a conical top, with cap K, conical cover, and supply-spout, substantially as set forth.

6. The combination of the casing, the shaft, and a horizontal grooved disk, I, with a cap, having an annular depression, *k*, in close proximity to the grooved surface of the disk, substantially as described.

7. The combination of the casing, the rotating shaft, and a horizontal grooved disk, I, with a conical hopper, L, having a horizontal under surface, *l*, in close proximity to the grooved surface of the disk.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY FERDINAND SAINT REQUIER.

Witnesses:
ALFRED COINY,
ROBT. M. HOOPER,
U. S. Consulate-General.