(No Model.) 2 Sheets—Sheet 1.

L. GATHMANN.

MACHINE FOR SPLITTING GRAIN.

No. 376,712. Patented Jan. 17, 1888.

Fig. 1.

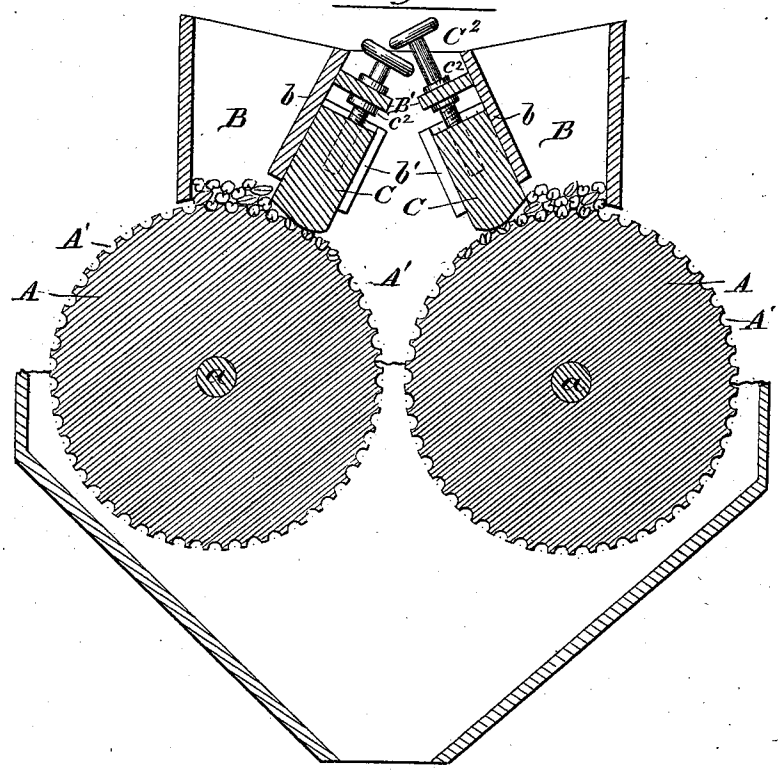
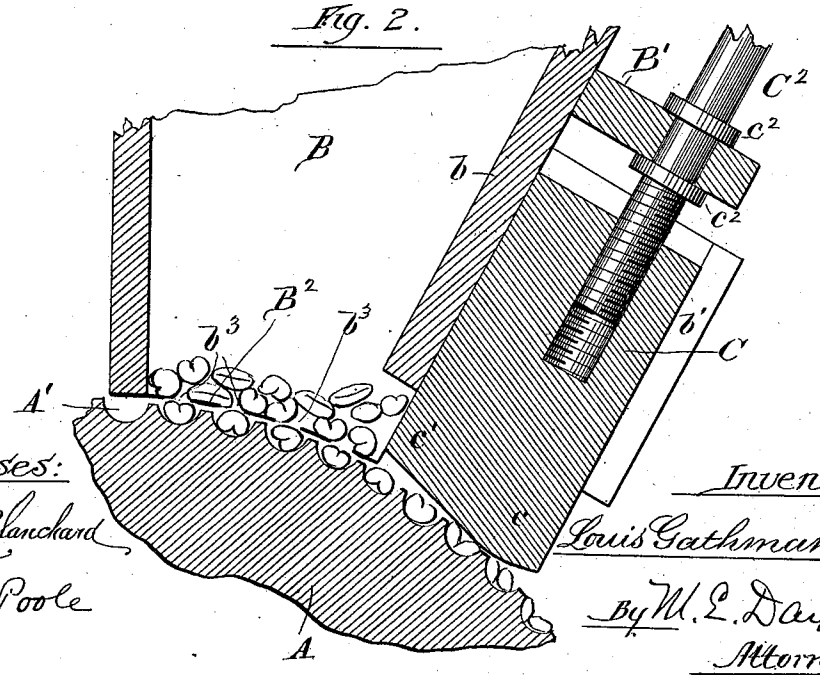


Fig. 2.



Witnesses:
Frank J. Blanchard
C. C. Poole

Inventor:
Louis Gathmann
By M. L. Dayton
Attorney.

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

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

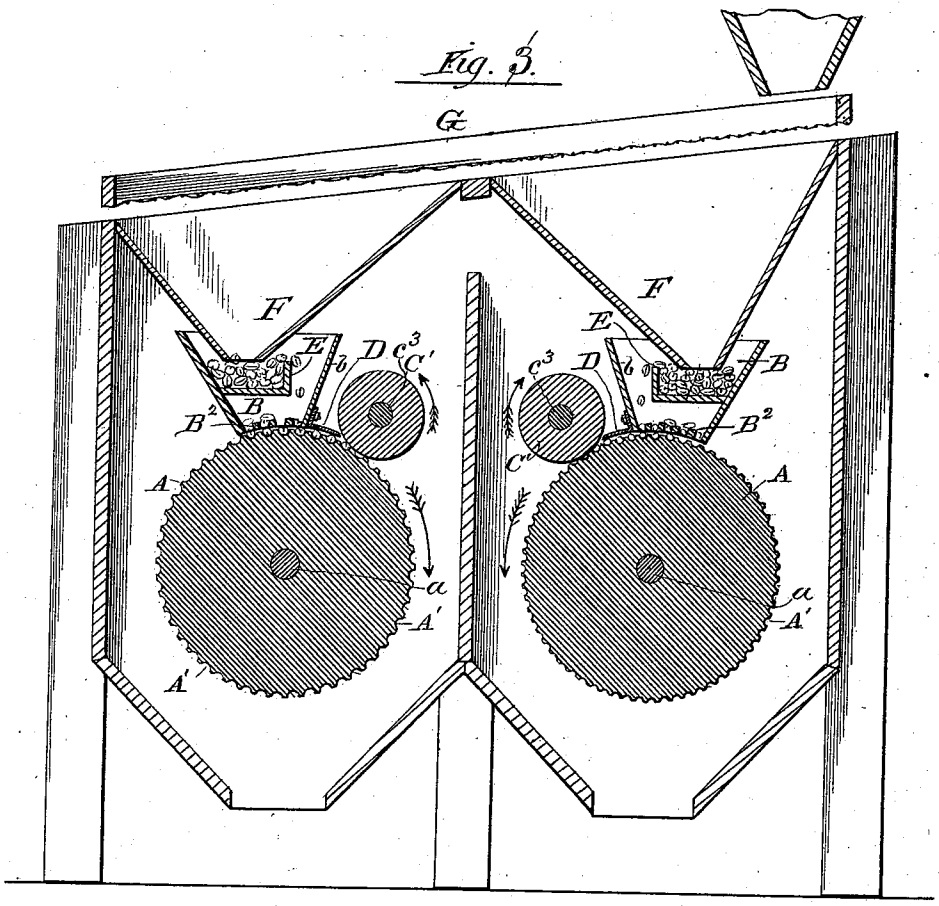


Fig. 4.

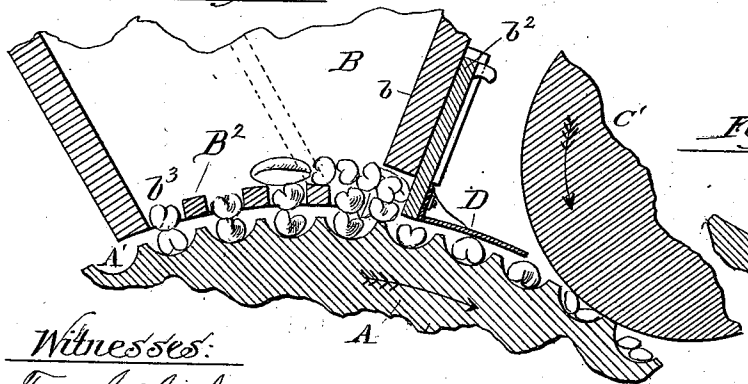
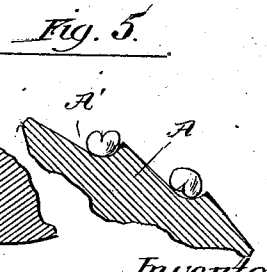


Fig. 5.



Witnesses:

Frank J. Blanchard

C. C. Poole

Inventor:

Louis Gathmann

By M. L. Dayton

Attorney

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

UNITED STATES PATENT OFFICE.

LOUIS GATHMANN, OF CHICAGO, ILLINOIS.

MACHINE FOR SPLITTING GRAIN.

SPECIFICATION forming part of Letters Patent No. 376,712, dated January 17, 1888.

Application filed September 12, 1885. Serial No. 176,869. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GATHMANN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Splitting Grain; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to machines for splitting lobated grains through the crease, and has for its object to produce a machine of the "rotating-cylinder" order adapted to effectively perform the work of splitting, as well as that of distributing and arranging the kernels preparatory to the work of splitting.

The invention consists, essentially, of a cylinder provided with longitudinal grooves in which the kernels may be disposed and spread open, in combination with a feed-box or hopper having its open bottom adjacent to the cylinder, so that the grain rests directly on the cylinder, some suitable means for holding back in said feed-box the entire mass of grain, except the kernels which lie in the grooves of the cylinder, and some suitable device by which the kernels when so distributed may be pressed and split.

In the accompanying drawings, Figure 1 is a view in transverse section of the essential elements of a duplex machine embodying my invention. In this figure the "splitter" is shown as also serving as a gate for regulating the distribution of the grain as it leaves the feed-hopper. Fig. 2 is a similar view of the same essential parts that are shown in Fig. 1, enlarged, together with an alternative device in the nature of a perforated or slotted plate forming a bottom of the supply-hopper, which plate, if preferred, may be employed for the disposition of the grain-kernels in the grooves of the cylinder. Fig. 3 is a similar view of a machine in which slots in a hopper-bottom are relied on to regulate the distribution of the grain upon the cylinder, and in which the splitter is of roller form and is unconcerned in the control of the feed. This figure also shows adjunctive devices for regulating the feed, which may be used, if desired. Fig. 4 shows the same character and arrangement of splitter as Fig. 3, but it shows a movable side wall or gate of the hopper, together with a partial slotted bottom, as the means of controlling the distribution of the grain upon the grooved cylinder. Fig. 5 shows a fragment of the grooved cylinder having a particular and possible but less desirable form of the longitudinal grooves therein.

Omitting particular description of such parts of a mill as are not directly concerned in my improvement, because they may be of various and well-known construction, A is a metal cylinder, preferably of chilled iron.

A′ A′ are longitudinal grooves in the curved surface of the cylinder, which grooves may be either direct or spiral. Viewed in transverse section, as shown, said grooves are curved flutes less in depth than the thickness of the grain-kernels to be split and wide enough to allow a kernel to spread freely while being split therein.

B is a hopper arranged close to the cylinder A, so that the mass of grain rests wholly or in part on the cylinder.

C or C′ is a device for pressing the grain-kernels against the cylinder after they have arranged themselves in the grooves of the latter, and thereby splitting them. This device is, for brevity, called a "splitter" or "presser." It is shown in two forms, one marked C and the other C′, and when mentioned herein without the designating letter both forms are meant to be included. This splitter extends the full length of and is proximate to the cylinder A, and is straight and smooth on the surface adjacent to said cylinder, but viewed endwise or in section is inclined upwardly or away from the cylinder toward the hopper, so that the grain-kernels may pass beneath it and be gradually subjected to the splitting pressure.

In Figs. 1 and 2 the splitter or presser (marked C) is in the form of an adjustably-fixed metal block having its lower or working surface rounded. The lowest point, *c*, of this surface is located very close to the cylinder A, so that the grain-kernels, arranged lengthwise in the grooves A′, cannot pass beneath it without being compressed and split. The higher point, *c′*, toward the hopper is, on the other hand, so far removed from the cylinder as to allow the kernels in the groove to pass freely beneath it. This form of splitter or presser,

as shown in Figs. 1 and 2, is mounted adjustably in stationary end guides constituted of the adjacent wall *b* of the hopper B and cleats *b'*, fixed to the end board of the hopper. The splitter or presser thus movably mounted is adapted to work on wheat or other lobated grain of different sizes previously sized or assorted. Its adjustment is effected by any suitable means, but preferably by the familiar device shown, and consisting of screws C^2, threaded into the splitter or presser and supported in a ledge or bracket, B', by collars c^2—one on each side of the bracket.

In Fig. 1 the splitter or presser thus movably mounted is made to serve in the disposition of the grain-kernels in the cylinder-grooves; but this is not an essential office thereof.

In Figs. 3 and 4 the splitter or presser is of roller form similarly arranged closely adjacent to the cylinder, and of course presenting on all sides the necessary form of working surface to allow the grain in the cylinder-grooves to pass under the same and into position to be split by pressure thereof. The roller may be suitably supported by an axial shaft, c^3, or by trunnions fitted to bearings in the end boards of the hopper or housing or on the frame.

The devices for disposing the kernels of grain in the grooves A' of the cylinder A may be various in form and mode of operation. That wall of the hopper toward the departing surface of the cylinder A may be set at a suitable distance from the cylinder to hold back the mass of grain, and to allow none to pass except those kernels which have settled lengthwise in the cylinder-grooves; or a gate may be adjustably applied to said hopper-wall, by which the said space may be varied to accommodate the passage of grains of different sizes. In Fig. 4 such an adjustable gate is shown at b^2, and in Fig. 1 the adjustable splitter or presser is arranged to serve as such a gate, the adjacent hopper-wall *b* in both cases being elevated high enough to allow the largest grains to pass, while the gate holds back all of the grain except those kernels which have settled into the cylinder-grooves A', as before stated.

In Figs. 2, 3, and 4 another form of device is shown for the distribution of the grain-kernels in the cylinder-grooves, consisting of a slotted or perforated bottom, B^2, of the hopper. This bottom is curved to conform with the curve of the cylinder, and stands concentric with and at such a distance from the cylinder that only kernels of grain in the cylinder-grooves can pass beneath it. The slots or passages b^3 in this hopper-bottom B^2 have the same direction as the cylinder-grooves, and are of width suited to the passage of a single grain at a time at any one point. The lowermost kernels of the mass of grain resting in part on the said hopper-bottom will adjust themselves to the direction of these slots and will pass through the slots only when the grooves A' come into place beneath them. Once admitted to the grooves A' the grain-kernels are carried forward beneath the bottom and under the splitter or presser, where they are compressed and split, and upon passing on from under the presser they are free to fall or to be otherwise discharged from the grooves.

In Fig. 4 the slotted plate B^2 covers only a part of the bottom of the hopper, and a portion adjacent to the gate b^2 is left open. The gate, therefore, acts as a distributer for the grain, which occupies said adjacent opening in the manner described.

When the splitter or presser is not close to the hopper, as in Figs. 1 and 2, means should be provided to prevent the escape of the grain-kernels from the grooves A' by centrifugal action due to the rotation of the cylinder A. Such a device is shown at D, Figs. 3 and 4, in the nature of a plate attached to the hopper or its gate and extending over the cylinder at a suitable distance therefrom to a point near the splitter or presser, which splitter from said point serves of itself to retain the kernels in the grooves.

The grooves A' are not necessarily of the semi-cylindric sectional form shown in the figures so far described, but may be of the sectional shape indicated in Fig. 5, in which the sides of the grooves are unequally inclined. Other variations may be made in the shape of the grooves without departure from my invention, so long as the characteristic feature is preserved therein of affording room for the kernels to spread and split under suitable pressure.

In Fig. 4 dotted lines indicate a possible wall of the hopper, which will cut off the perforated or slotted bottom and leave the hopper open-bottomed and with only the gate b^2 for the regulation of the feed.

In Fig. 3 an adjunctive contrivance is shown at E, consisting of a box placed in the hopper B and beneath a feed spout or hopper, F. The object of this device is to limit the quantity of grain resting on the cylinder and perforated hopper-bottom and a possible better disposition of the kernels in the slots of the bottom B^2 than when the entire mass of grain rests on the bottom. In said Fig. 3 also two grooved cylinders A are arranged parallel with each other in separate compartments or housings, and the grooves of one cylinder are represented as larger than those of the other. Over both compartments runs a screen, G, having finer mesh at its higher end, which is over the hopper feeding to the cylinder having the smaller grooves, and coarser mesh at its lower end, which is over the hopper feeding the cylinder having the larger grooves. This forms a duplex sizing and splitting machine adapted to assort and separate the grain and deliver the several sizes to splitting devices of appropriate size and adjustment. Separate discharge-hoppers deliver the products at different points.

In Fig. 1 the two grooved cylinders shown are arranged in or over a single hopper for

the product, and they are intended to be run inwardly and downwardly toward each other.

Obviously, the grooved rollers herein described may be substituted for other forms of rolls in many forms of roller reduction-mills for grain now in use and the splitter or presser added for the purpose of utilizing the main structure of such mills. It is also obvious that the feed-hopper may be arranged to deliver to the cylinder at other points than at the top, and that the splitter or presser may be placed elsewhere than above the grooved cylinder; but for manifest reasons the location of both the hopper and the splitter or presser above the cylinder is preferable.

I claim as my invention—

1. The combination, with a rotating cylinder provided with longitudinal grooves somewhat wider than the grain-kernels to be operated upon, of a feed box or hopper constructed and arranged to allow the grain to pass directly to the cylinder and to retain the grain, except the kernels, in said grooves, and a smooth-surfaced presser arranged to press and thereby split the grain-kernels in the cylinder-grooves as they are carried beneath the presser in the rotation of the cylinder, substantially as described.

2. The combination of a rotating grooved cylinder, a feed box or hopper arranged to allow the grain to rest directly on the cylinder, a device for distributing the grain-kernels in the cylinder-grooves, a plate (as D) for retaining the kernels in said grooves on their way to the presser, and a smooth-surfaced presser operating to split the kernels more or less remote from the distributing device, substantially as described.

3. The combination of a longitudinally-grooved rotating cylinder, a feed-hopper having its walls constructed to present an open bottom adjacent to the cylinder, and also to present a lateral opening toward the departing surface of the cylinder, a smooth-faced presser arranged to press and split the grain in said grooves after they have left the hopper, and suitable devices for adjusting the lateral opening, substantially as described.

4. The combination, in a machine for splitting grain, of a rotating cylinder provided with longitudinal grooves, a feed box or hopper constructed and arranged to allow the grain to rest directly on the cylinder, and a smooth-surfaced presser adapted to hold back the grain not in the cylinder-grooves and to press and thereby split the berries on the line of the crease in said grooves, substantially as described.

5. The combination, in a machine for splitting grain, of a longitudinally-grooved rotating cylinder, a hopper having a slotted bottom curved concentric with said cylinder, and a smooth-surfaced presser adapted to press the grain in the cylinder-grooves, and thereby split the grain on the line of the crease, substantially as set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

LOUIS GATHMANN.

Witnesses:
M. E. DAYTON,
G. F. LANAGHEN.