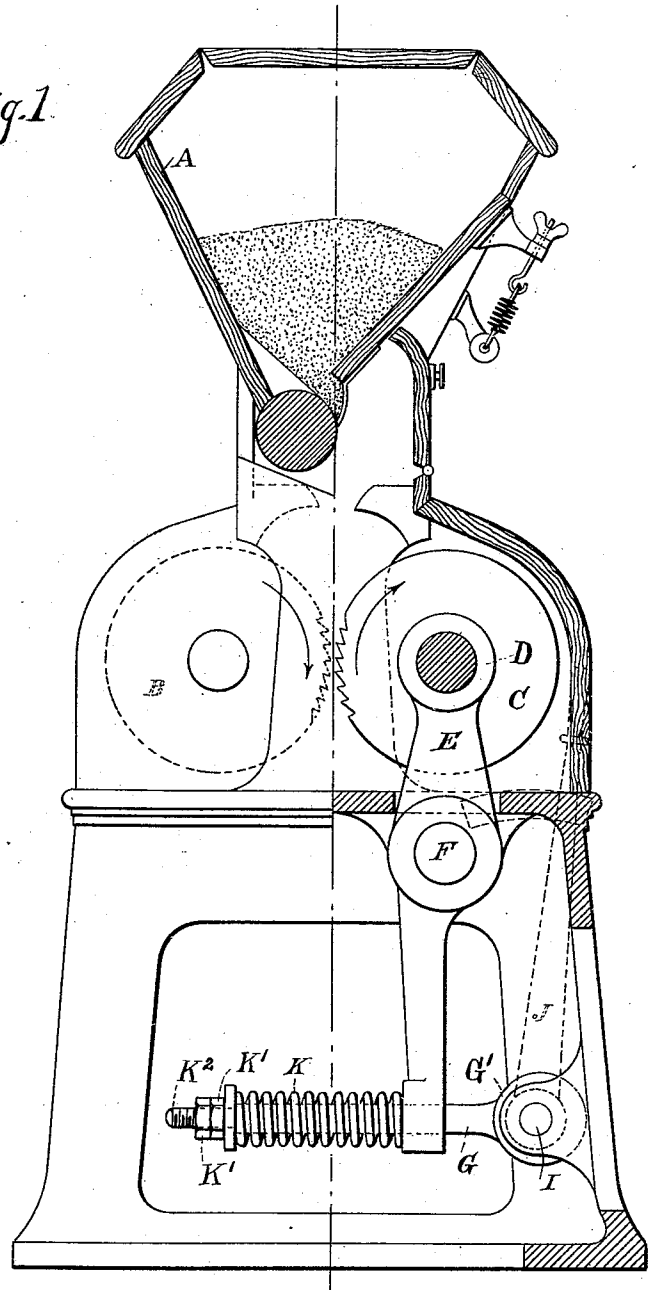
(No Model.) 2 Sheets—Sheet 1.

J. SLOAN.

DECORTICATING GRAIN.

No. 484,258. Patented Oct. 11, 1892.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

J. SLOAN.

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Fig. 2.

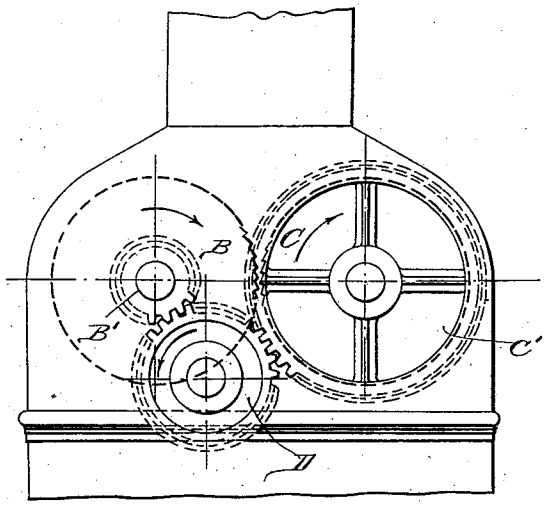
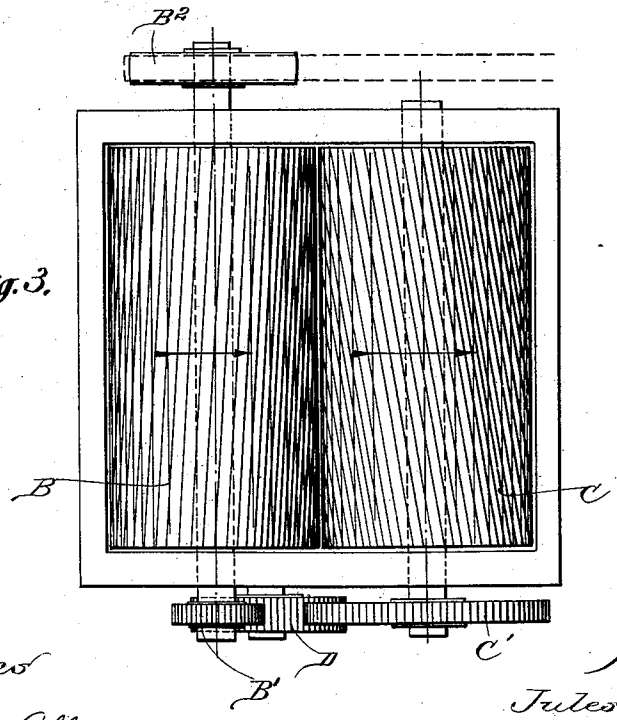


Fig. 3.



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UNITED STATES PATENT OFFICE.

JULES SLOAN, OF PARIS, FRANCE.

DECORTICATING GRAIN.

SPECIFICATION forming part of Letters Patent No. 484,258, dated October 11, 1892.

Application filed April 18, 1890. Serial No. 348,487. (No model.) Patented in Belgium January 8, 1890, No. 66,732; in France January 9, 1890, No. 189,931, and in England February 1, 1890, No. 1,772.

To all whom it may concern:

Be it known that I, JULES SLOAN, engineer, of Paris, in the Republic of France, have invented certain new and useful Improvements in an Apparatus for Decorticating Grain, (for which I have obtained Letters Patent in Belgium, dated January 8, 1890, No. 66,732; in France, dated January 9, 1890, No. 189,931, and in England, dated February 1, 1890, No. 1,772,) of which the following is a specification.

My invention relates to an improved apparatus for the hulling or decortication of corn or other grain.

The improved apparatus comprises two peculiarly fluted or corrugated cylinders or rollers, which instead of turning in opposite directions at differential velocities for obtaining a decorticating action, as is most common with machines of this class, turn in the same direction, so that their contiguous faces will pass each other in opposite directions, as shown in the accompanying drawings. Moreover, my improved cylinders are further distinguished from ordinary reduction cylinders by the arrangement of the corrugations or their perimeters, which cannot by any means be directed in the same direction and angle on both cylinders which run at different speeds, because in this case the most of the grain would be crushed near one extremity of the cylinders without undergoing the desired rubbing action; but I have found it necessary in order to produce the best results to cause the corrugations of the two cylinders when rotating to cross at a determined angle corresponding most favorably with the action, which angle of crossing cannot be constant, but, on the contrary, varies with the rapidity with which the cylinders rotate. In fact, that action on the grain passing between the cylinders depends in part upon the time that the crossed corrugations employ in making it pass, so that the more rapidly the cylinders turn the less the corrugations ought to be inclined. In order to fix the idea it can be said that if an inclination of fifteen degrees for the corrugations of a roll corresponds to a rapidity of rotation of one hundred turns it would be necessary that this inclination be about five degrees for a rapidity of three hundred turns, and the degree of opening of the angle of crossing of the corrugations of the two rolls is inversely proportional to the number of turns of the cylinders, or at least of one of the cylinders. Without rigorously observing this law for the system of cylinders turning in the same direction and at different speed it is impossible to obtain good and practical results. The grain on being fed between the aforesaid two cylinders or rollers, one of which tends to throw it upward and the other to take it downward, is caused to turn during the time which it remains between the two cylinders or rollers. The cylinder or roller tending to carry the grain downward is rotated at a great velocity, while the cylinder or roller which has a tendency to throw it upward is turned more slowly, so that after a certain number of turns the former cylinder or roller conveys the grain through the space between it and the center or the nearest point of contact with the second cylinder or roller, whereupon this grain falls down—that is to say, after it has passed through all the phases of the hulling or decortication. When the grain passes between the cylinders or rollers and performs its first turn, it will be slightly cracked, after which it is hulled, and on passing the center the granules still attached to the barn are detached. It is not intended to effect the hulling or decortication of the grain according to my invention in a single operation, but in two, three, or more successive reducing operations, one of which serves for the removal of the outer parts and the other or others for completing the cleansing of the bran.

I will now proceed to describe the preferred form of my improved apparatus (shown in the accompanying drawings) for hulling or decorticating corn or other grain.

In said drawings, Figure 1 is a transverse sectional elevation of a mill embodying my improvements. Fig. 2 is a detail side elevation representing the differential gearing for driving the cylinders at different rates of speed in the same direction. Fig. 3 is a top plan representation of the cylinders, showing the dress.

A is a suitable hopper supported above the cylinders for feeding and distributing the grain to be hulled or decorticated. This dis-

tribution is effected automatically, according to the quantity of the grain in the said hopper, which is an indispensable condition in automatic hulling operations. A spring-controlled gate arranged in one side of the hopper yields each time when the quantity of the material is increased in the hopper and allows the excess to pass. Accordingly the distribution takes place in direct proportion to the quantity of material which is in the hopper. This distributing device may be of any suitable construction. The grain thus distributed falls between the two cylinders or rollers, one of which B is held in fixed bearings and is revolved at a high velocity, while the other C, which revolves at a small velocity, is mounted in two sleeves D, formed in the upper ends of levers E, which are adapted to oscillate upon their axis F. Through the lower end of each of the aforesaid levers E extends a rod G, surrounded by a spring K, which is confined thereon between the lower end of one of the levers E and the end of the rod G by means of screw-nuts K′, engaging on screw-threaded portions K^2 of the rod. This arrangement enables one of the said cylinders or rollers to recede from the other in case pieces of iron or the like should pass between them. The aforesaid rods G are provided at their opposite ends with enlargements or eyes G′, which are mounted upon suitable eccentrics controlled by an operating-lever J. This lever is secured upon the shaft I of the said eccentrics, which shaft extends through the entire width of the apparatus and carries an eccentric at each end and serves to establish a connection between the two levers E, so that they may be moved in unison.

The flutes or corrugations on the surface of the cylinders or rollers B and C are arranged spirally, left-handed threads being formed on one of the cylinders or rollers and right-handed threads on the other, as shown in Fig. 3. The inclinations of the threads on the two cylinders or rollers must not be equal, but in inverse ratio to the velocity imparted to the said cylinders or rollers. For example, if the cylinder or roller which tends to throw the grain upward makes fifty revolutions and the cylinder or roller which tends to carry the grain downward makes one hundred and fifty revolutions the first is provided with left-handed threads extending at an inclination of seventy-five millimeters in three hundred and fifty millimeters and the second with the right-handed threads extending at an inclination of twenty-five millimeters in three hundred and fifty millimeters.

For converting grit into flour I can make use of the same apparatus as hereinbefore described, in which case smooth cylinders or rollers are, however, substituted for the fluted cylinders or rollers.

As hereinbefore stated, the cylinders B and C are run in the same direction at different rates of speed, the speed corresponding to the inclinations of the corrugations on the cylinders. For accomplishing this purpose I provide the journal ends of the cylinders B and C with the differential gear-wheels B′ and C′, respectively, which are geared together by the intermediate gear D, the cylinder B being driven by the band-pulley B^2 on its opposite journal end. It is quite clear that by changing the differential gear between the two cylinders their relative speeds of revolution can be arranged to suit any change in the relation of their corrugations.

Having now fully described my said invention and in what manner the same has to be performed, what I claim is—

1. The combination of the rotatable roll B and the rotatable roll C, arranged to rotate in the same direction at different speeds, one of said rolls having left-hand spiral corrugations and the other roll having right-hand spiral corrugations, substantially as set forth.

2. The combination of the roll B and the roll C, arranged to rotate in the same direction at different speeds, one of said rolls having left-hand spiral corrugations and the other right-hand spiral corrugations, the inclinations of said corrugations being arranged in inverse ratio to the velocity of the roll, substantially as set forth.

3. The combination of the roll B, rotatably mounted in fixed bearings in the frame, the roll C, rotatably mounted in the upper ends of pivoted levers E, rods G, passing through the lower ends of said levers and provided with eyes G′, springs K, seated on said rods and confined against the lower ends of levers E, shaft I, carrying eccentrics which engage in the eyes G′, and a lever J for operating said eccentrics, substantially as set forth.

In testimony whereof I have hereunto set my hand this 27th day of February, 1890.

JULES SLOAN.

Witnesses:
HU. CERNETTE,
E. EVERETT.