No. 816,390. PATENTED MAR. 27, 1906.

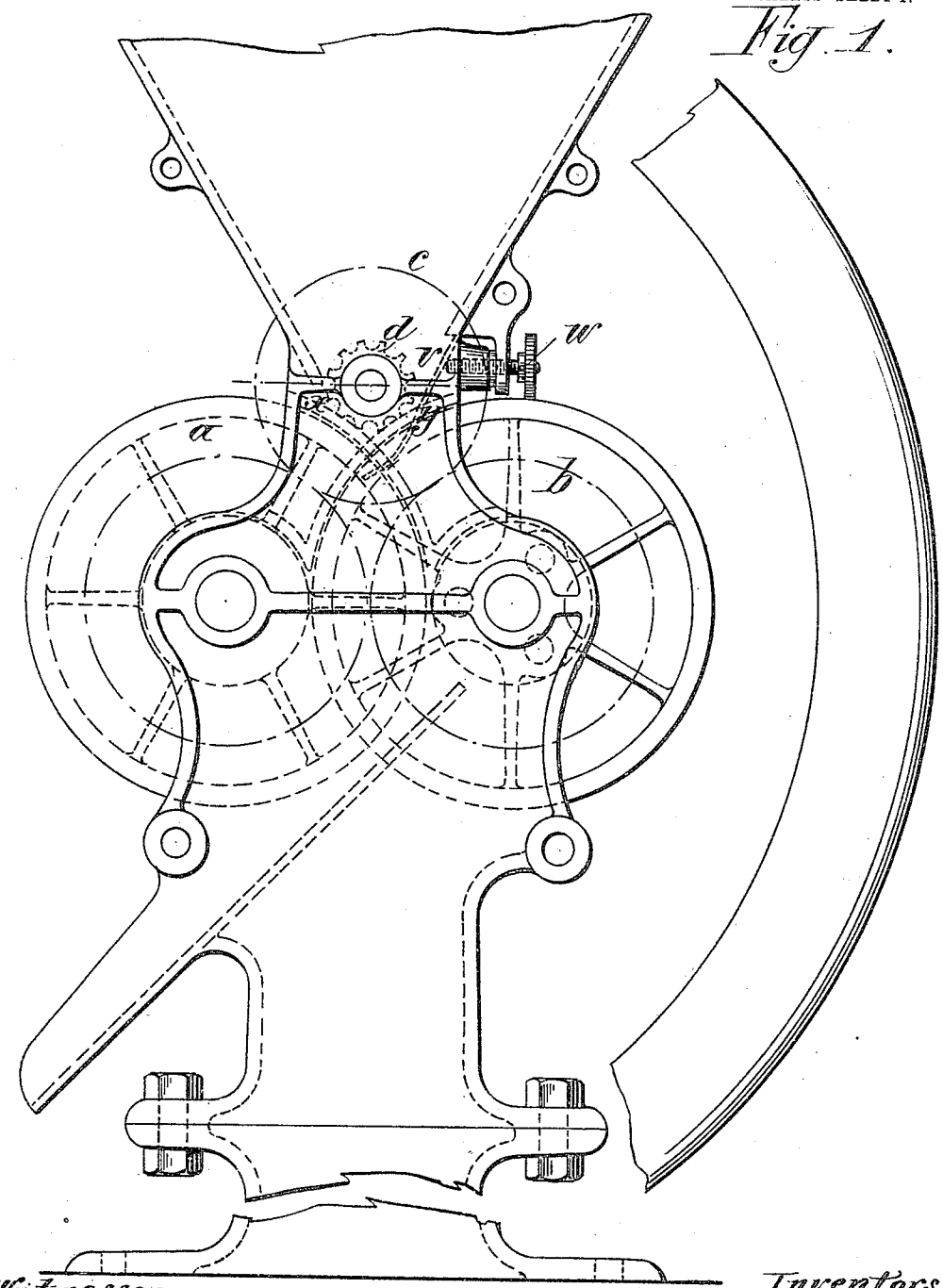
ALBERT SIMON & AUGUSTE SIMON.

APPARATUS FOR CRUSHING GRAIN.

APPLICATION FILED JAN. 5, 1903.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
L. Waldmann
C. Heymann.

Inventors.
Albert Simon and Auguste Simon
per B. Singer
Attorney.

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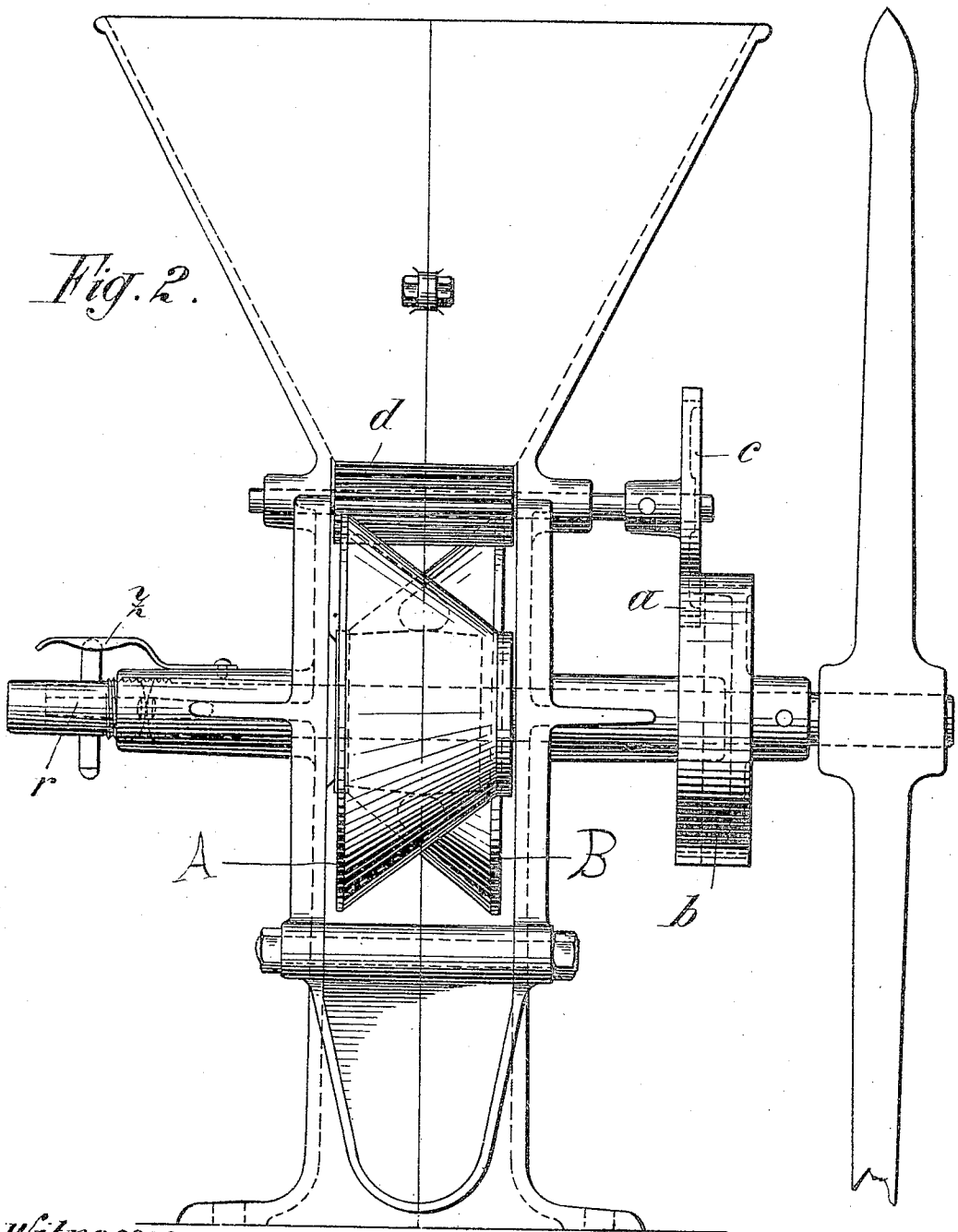
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4 SHEETS—SHEET 2.

Fig. 2.



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L. Waldman
C. Heymann

Inventors:
Albert Simon and Auguste Simon
per P. Singer.
Attorney.

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4 SHEETS—SHEET 3.

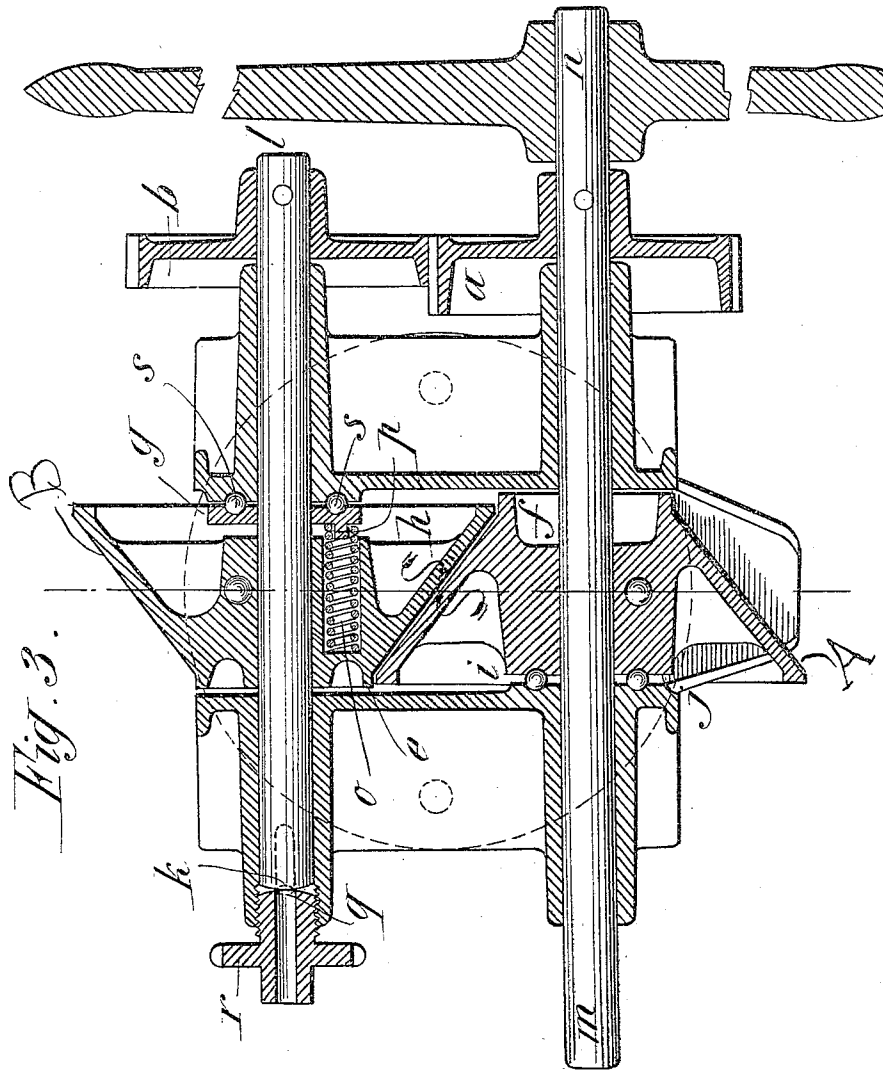


Fig. 3.

Witnesses:
L. Waldman
C. Heymann.

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4 SHEETS—SHEET 4.

Fig. 4.

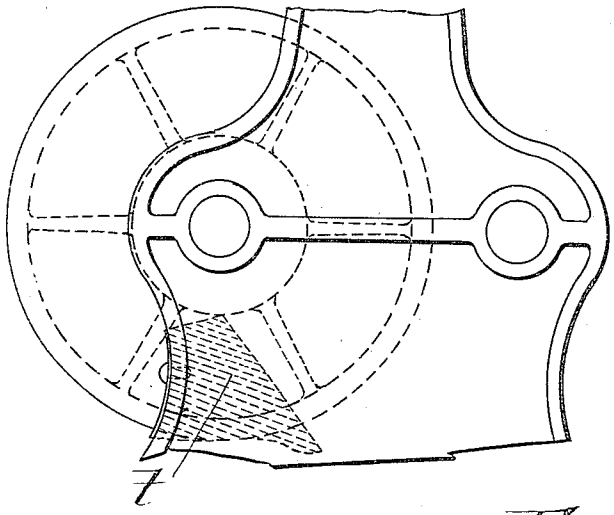
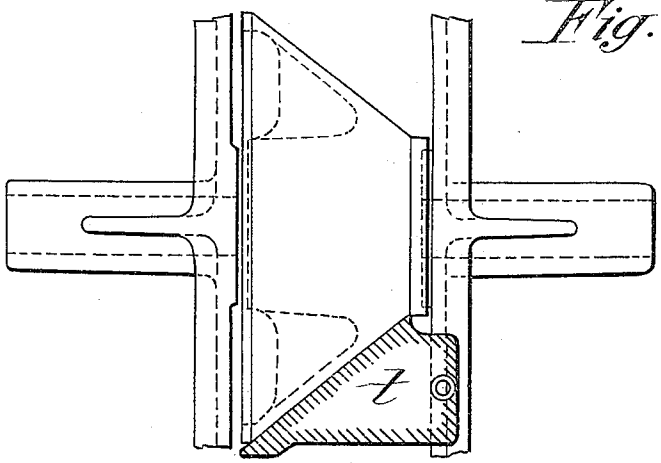


Fig. 5.



Witnesses:
S. Waldman
C. Heymann.

Inventors:
Albert Simon and Auguste Simon
per P. Singer
Attorney

UNITED STATES PATENT OFFICE.

ALBERT SIMON AND AUGUSTE SIMON, OF CHERBOURG, FRANCE.

APPARATUS FOR CRUSHING GRAIN.

No. 816,380. Specification of Letters Patent. Patented March 27, 1906.

Application filed January 5, 1903. Serial No. 137,923.

To all whom it may concern:

Be it known that we, ALBERT SIMON and AUGUSTE SIMON, engineers, of Cherbourg, France, have invented a certain new and useful Improved Apparatus for Crushing Grains, (for which we have obtained a patent in France, No. 320,186, bearing date April 4, 1902; in Belgium, No. 164,949, bearing date August 12, 1902; in Spain, No. 30,239, bearing date August 16, 1902, and in Luxemburg, No. 4,870, bearing date August 12, 1902;) and we do hereby declare that the following is a full, clear, and exact description of the same.

The necessity for flattening grain is now so well recognized at the present time that we do not think it is necessary to set forth its uses, the most important of which consists in crushing to a certain degree the grain intended for the food of animals.

The flattening devices for grain as constructed hitherto are composed, as regards their main parts, of two rolls or cylinders, usually of different diameters. The greater part of designers have adopted smooth rolls. Some, however, have adopted grooved or fluted cylinders, the grooves of the one cylinder corresponding exactly to the ribs of the other roll, but these differently-shaped rolls are still cylinders. Now the flattener which forms the subject of the present application for a patent differs completely from those which have been constructed hitherto. The accompanying drawings, which are given by way of example, show one form of construction of the same.

In the drawings, Figure 1 is a general view, in front elevation, of the apparatus. Fig. 2 is a view partly in side elevation thereof. Fig. 3 is a horizontal section thereof along a plane passing through the axis of the cones which constitute the working part of the apparatus. Figs. 4 and 5 are detail views thereof.

The flattening parts are constituted by two conical rolls A and B, Fig. 3, which revolve toward each other, as indicated by the arrows. In Fig. 3 they are shown driven by two gear-wheels *a b;* but they may be driven in any other manner—say by means of a chain, cord, &c. They may even work without any other aid than the grip given by the material being treated, and the gear-wheels have no other object than to obviate slipping, which is always possible, while at the same time the gearing *a* serves, by means of the third gear-wheel *c*, Fig. 1, to drive the distributing-roller *d*, hereinafter referred to.

The flattening operation takes place along the line of contact *e f* of the two cones, Fig. 3, all the circles passing through each of the points of the said line of contact, except one point, namely—that point which is situated exactly at the center of the said line—revolve with different circumferential speeds, which are very favorable, first, to the splitting or bursting of the envelop of long grain, (oats, barley, wheat, rye, &c.,) which is a much sought for condition; second, to the elongated flattening of round grain, (broad beans, maize, buckwheat, &c.)

We shall now describe the behavior of grain in our flattening apparatus. Assuming that a grain is placed at any spot on the line of contact of the cones and that the said grain happens to be situated either lengthwise or crosswise of that line, then it is clear that in view of our statement regarding the difference in the speeds all the points of the grain under consideration will be subjected to a different degree of elongation, whence there results a sudden splitting or bursting of the envelop. These differences in the speeds have in addition the great advantage of allowing the rolls to be set at a greater distance apart than could be done with the other systems in order to produce an equal degree of flattening, whence there results the capacity of reducing by a very large extent the bulk of our apparatus as compared with those constructed up to the present time.

In the flattening apparatus constructed hitherto the stresses are received entirely by the axes of the two cylinders. In our device these stresses are distributed laterally on the faces *g h i j*, Fig. 3, of the hubs and of the frame, then longitudinally on the axles *k l m n*, Fig. 3, of the rolls, and are, so to speak, counterbalanced by reason of the angle which is adopted for the cones.

The use of any number of coiled springs *o*, Fig. 3, allows hard substances mixed up with the grain to escape, without, however, yielding beneath the flattening action of the grains. It must be noted that the pressure of these springs instead of jamming the roller furnished with springs against the other roller, as happens in other systems, is exerted upon a stop *q*, Fig. 3, of the micrometrical nut *r*, which maintains the rollers at a suitable and constant distance apart.

To reduce friction as much as possible, we have inserted between the contacting surfaces a crown of balls *s*, Fig. 3. The friction of

the axle *k l m n*, Fig. 3, can also be reduced by the insertion of rollers or sets of balls or mounting rollers on balls, as commonly done, for instance, in reapers and high-class carriage-axles, &c.

In agricultural and other appliances—such as flatteners, crushers, &c., and generally all appliances performing their work by a rotary motion—the body of the machine generally comprises four parts—viz., first, the frame; second, two cheeks fitted to the frame and which are provided with plummer blocks or sockets receiving the axle or axles; third, a hopper fixed on the cheeks into which are charged the materials to be treated. In our flattening apparatus these four main parts—one frame, two cheeks, one hopper—have been reduced to two parts only by the design of the patterns. In fact, as is clearly shown in Figs. 1 and 2, the frame, cheeks, and hopper are connected together in one single piece which forms one-half of an entirety, this being done for the sake of facilitating the casting thereof. Two pieces only connected together by bolts, as shown in Fig. 2, now replace the four pieces which it was necessary to have hitherto. It is clear that this arrangement results in a great saving in the weight of the raw material and in great saving in time in the manufacture thereof.

The cylinder *d*, Fig. 3, in the periphery of which there are cut a certain number of cups, forms with the distributing-piece *v*, Fig. 1, which is of a suitable shape, and the regulating-screw provided with the hand-wheel *w*, a new device for feeding or distributing the grain.

The joint-covers *x y* (shown in Fig. 1) have for their object to cover the rollers at that portion of their periphery where the grain might escape between the rolls and the faces of the frame.

The scrapers *t*, of which there may be a plurality, but only one of which is shown in Figs. 4 and 5, have for their object to keep the two rollers quite clean, as these rolls without those parts would become sticky immediately, with the result of rapidly choking the apparatus. The arrangement of these scrapers is also novel. Hitherto these accessories have been made in two pieces—first, the scraper proper, generally of sheet-steel, and, second, one or more springs or one or more counterweights having for object to keep the scraper up to its work. In our apparatus the sheet-steel scrapers (they might be made of any other suitable material) are sufficient of themselves alone by reason of their special construction in tension, as shown in Figs. 4 and 5. They are at the same time springs and scrapers.

Finally, we have as a new means of regulation or adjustment a micrometric screw-nut *r*. (Shown in Figs. 2 and 3.) This nut, as above stated, allows of keeping the two rolls at a suitable distance apart. It is held in adjusted position by means of a safety-pawl *z*, Fig. 2. This safety-pawl is also a novelty in view of the fact that hitherto the pawl which locked these micrometric nuts in position in agricultural and other apparatus is composed of a jointed metal piece provided with a counterweight or with a spring. Our pawl is sufficient of itself alone because it consists of a single spring-blade of suitable form.

What we claim as our invention, and desire to secure by Letters Patent, is—

In an apparatus for crushing grain, the combination of two shafts, coacting cones mounted on said shafts, a suitable framework in which said shafts are carried, one of said shafts being slidably mounted in said framework, a rotating disk on said shaft adapted to bear against said framework, a coil-spring in the hub of the cone on said slidable shaft bearing against said ring, and a screw in the frame bearing against which the end of said slidable shaft is adapted to be thrust by the action of said spring.

In testimony whereof we have hereunto set our hands in presence of two witnesses.

ALBERT SIMON.
AUGUSTE SIMON.

Witnesses:
IRLATERRE,
JULES DELORT