

(No Model.)

W. S. WOOD.  
GRAIN AND SEED SEPARATOR AND GRADER.

No. 429,749.

Patented June 10, 1890.

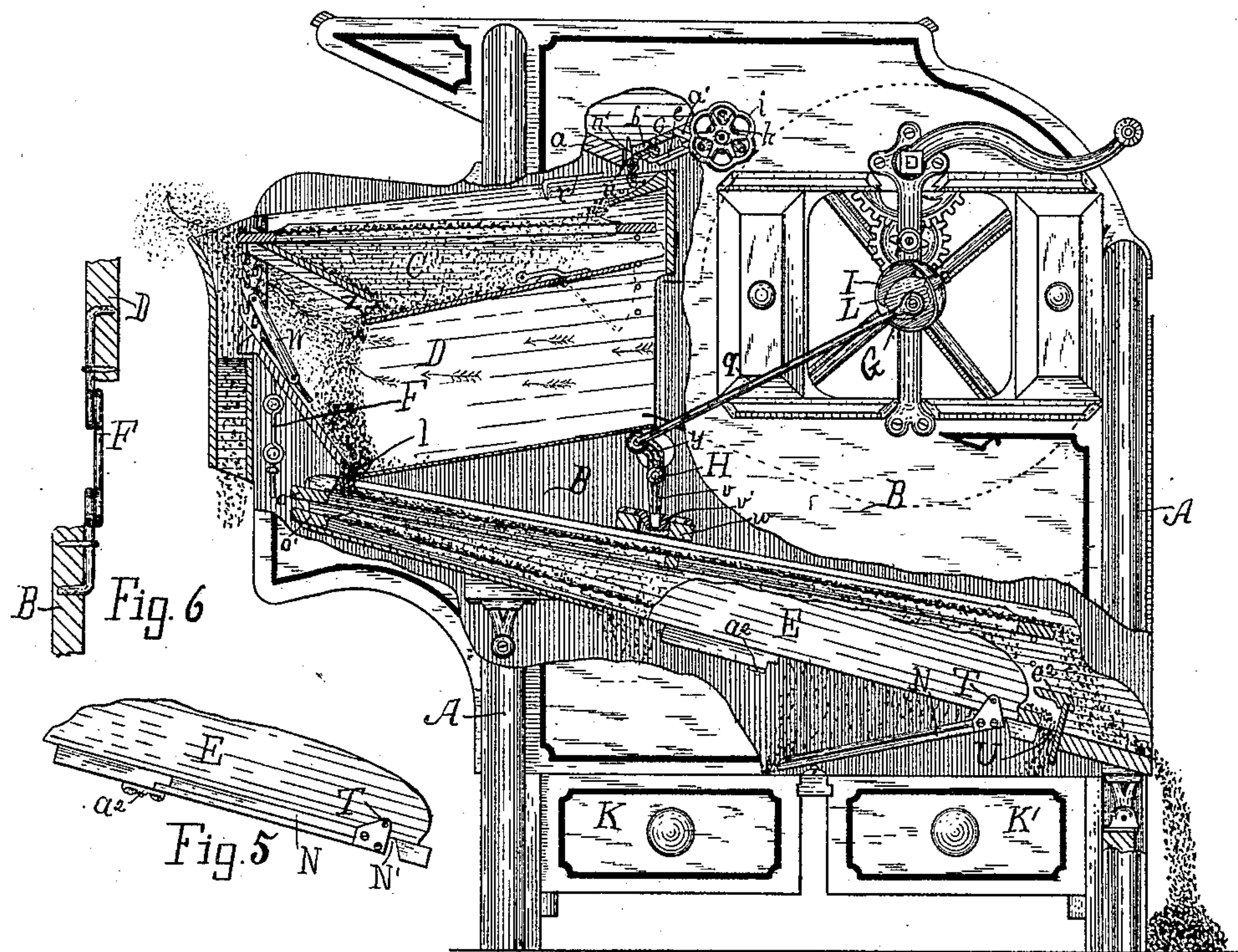


Fig. 6

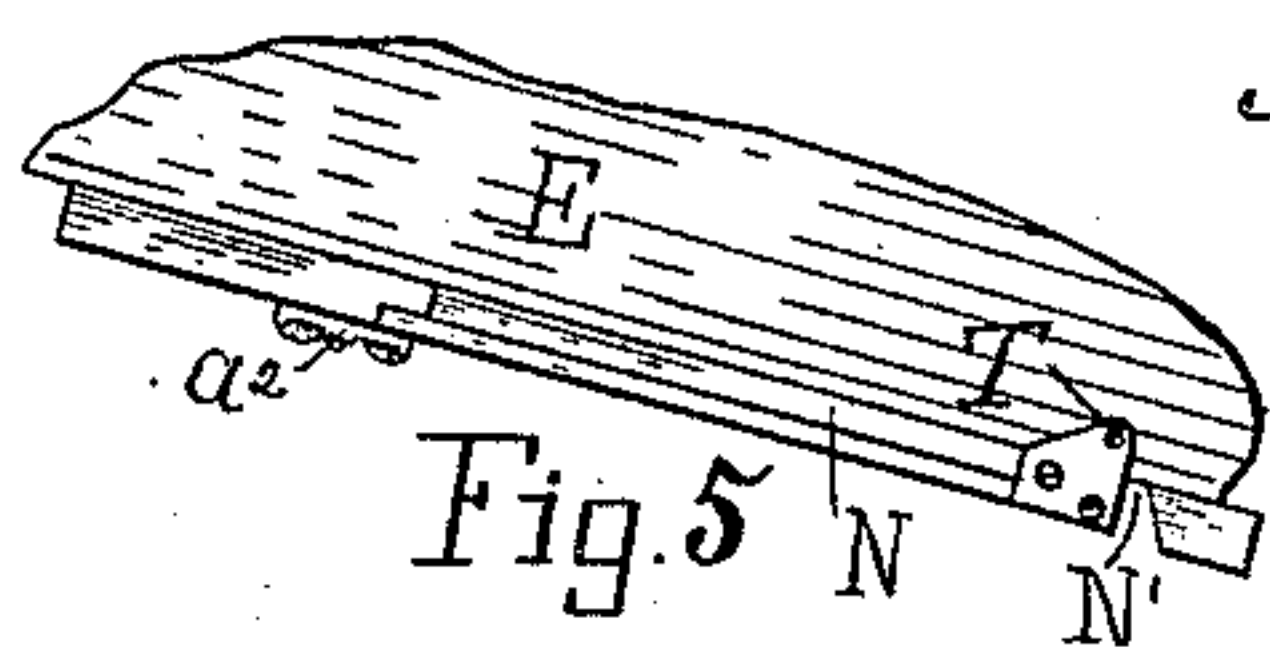


Fig. 5

Fig. 1

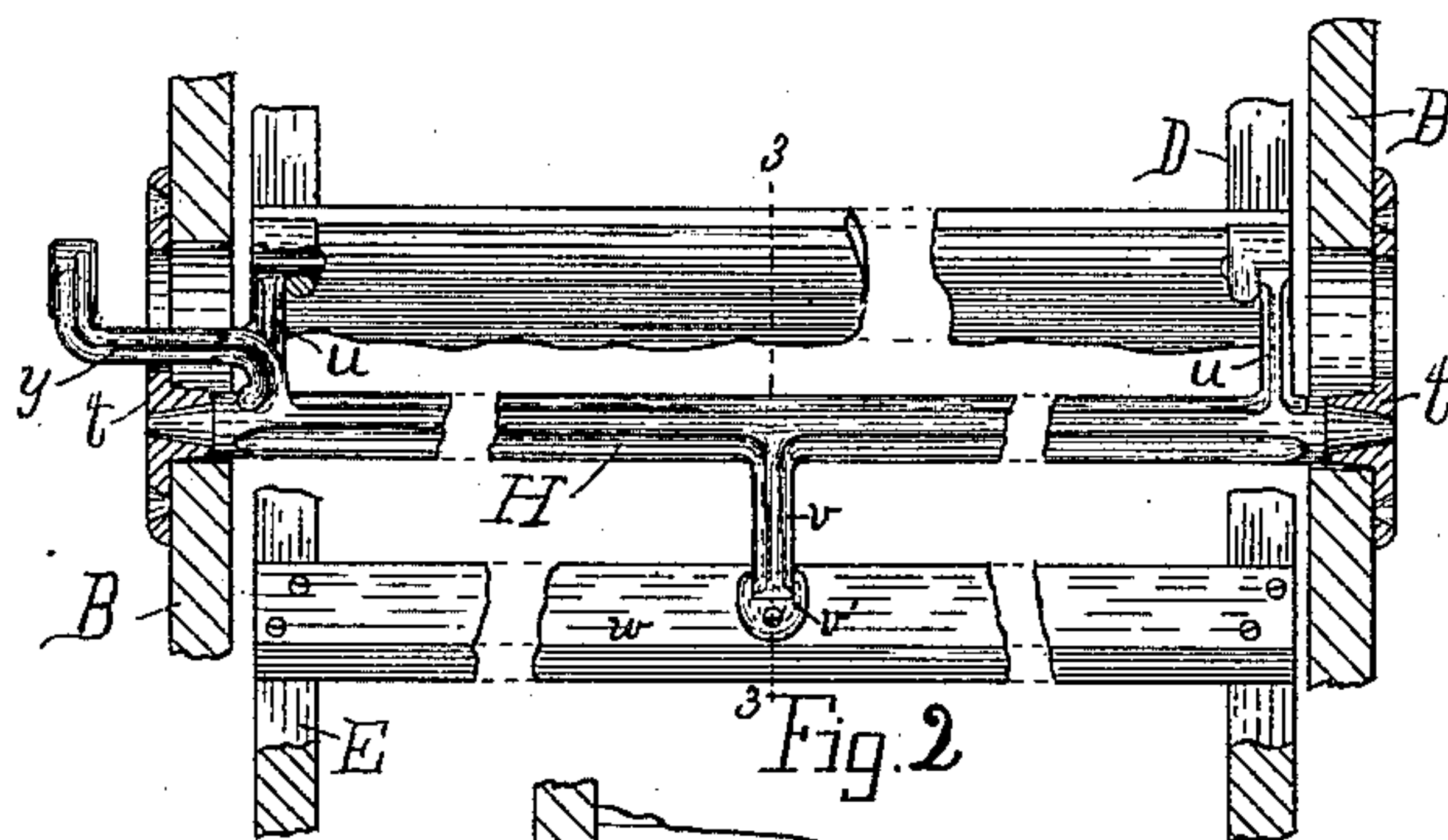


Fig. 2

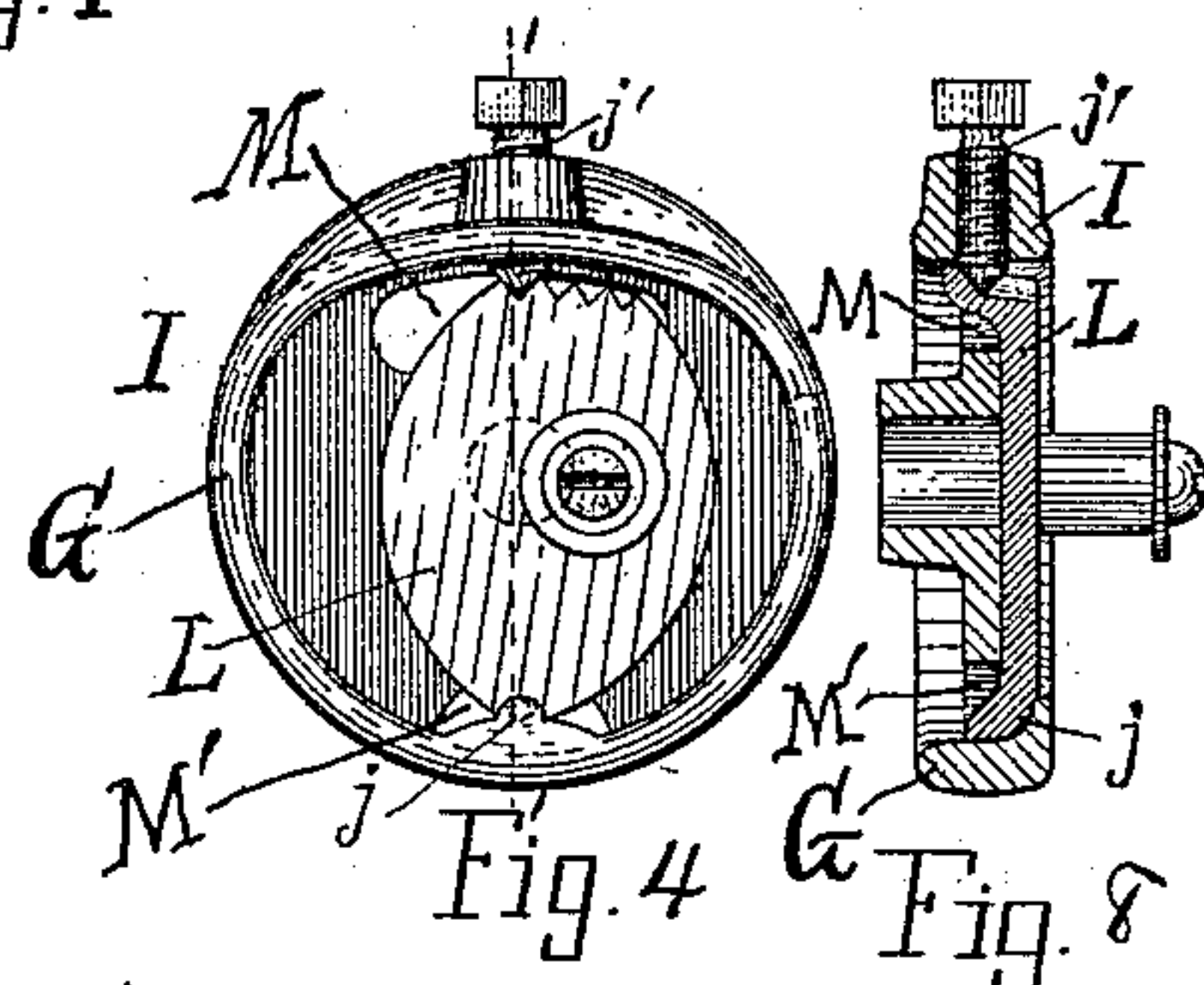


Fig. 4

Fig. 8

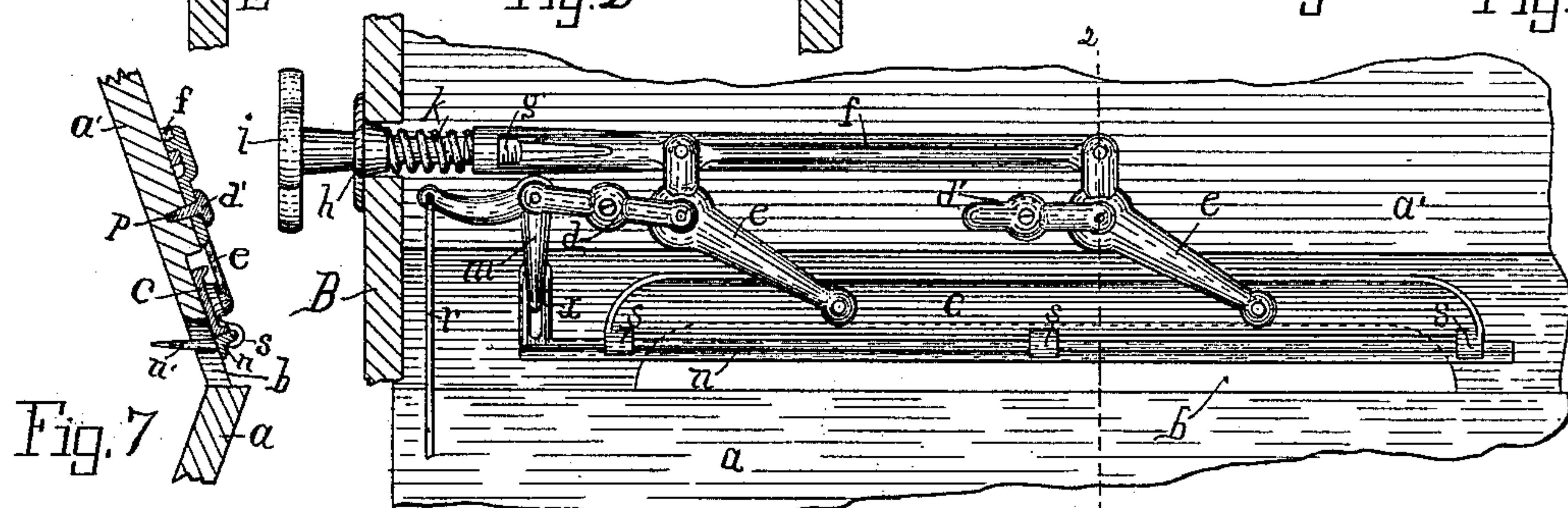


Fig. 3

Fig. 7

Witnesses.

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## GRAIN AND SEED SEPARATOR AND GRADER.

SPECIFICATION forming part of Letters Patent No. 429,749, dated June 10, 1890.

Application filed August 3, 1889. Serial No. 319,649. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER S. WOOD, a citizen of the United States, residing in the city of Kalamazoo, county of Kalamazoo, and State of Michigan, have invented certain new and useful Improvements in Grain and Seed Separators and Graders, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention will first be described, and then pointed out in the claims.

Figure 1 is a side elevation of my grain and seed separator and grader, with a portion of the side casing broken away for the purpose of showing the interior construction and location of parts, certain of which appear in longitudinal sections on line 3 3 of Fig. 2, which is an enlarged detail of portions of Fig. 1, showing the rock-shaft and its connections. Fig. 3 is an enlarged detail of a portion of Fig. 1, showing details of certain parts in inverted plan view. Fig. 4 is an enlarged elevation of the crank-wheel. Fig. 5 is a detail of a portion of lower shoe. Fig. 6 is an enlarged detail of the spring-supports, showing manner of attaching to shoe-sides and side casings. Fig. 7 is a section of Fig. 3 on line 2 2. Fig. 8 is a section of Fig. 4 on line 1 1.

Similar letters refer to similar parts throughout the several views.

In the drawings, A A, Fig. 1, represent the uprights or posts, of which there are four, which are connected transversely by girts which form the frame to which the side casings B B are secured. A hopper is formed at the top and between said side casings by means of the bottoms *a* and *a'*, which extend transversely across between and are held in place by means of grooves in side casings B B. The bottom *a'* has a portion removed from its lower edge, as shown at *b*, Figs. 1, 3, and 7, to provide an opening through which the grain or seed passes through the sieves. To regulate the size of said opening there is provided a slide or gate *c*, which is held in position and operated by means of the arms *e e*, which are pivotally connected to said slide or gate *c*, as shown in Figs. 1, 3, and 7. Arms

*e e* are also pivotally secured to bottom *a'* by means of the caps *d* and *d'*, which have a pivotal point projecting through arms *e e* and embedded in bottom *a'*, as shown at P, Fig. 5 7. The arms *e e* are also pivotally connected to strap *f*, which receives a longitudinal motion by means of the screw *g*, the threaded portion of which engages with strap *f*, Fig. 3, said screw being adapted to turn in journal-box *h* by means of the hand-wheel *i*, said box being firmly secured to side casing B. By turning hand-wheel *i* to the right or left the connecting-strap *f* is drawn back or forth by means of the screw *g*, which imparts motion to the arms *e e*, through which slide *c* receives in its adjustment a motion corresponding to the arc of a circle. The coiled spring *k* on screw *g*, between the end of strap *f* and journal-box *h*, is for the purpose of allowing screw *g* a longitudinal movement through journal-box *h* for the purpose of instantly opening slide or gate *c* when required by the operator pulling out on hand-wheel *i*. Thus it will be seen that when gate *c* is set to the required opening it may be instantly opened to its fullest capacity, and when released by the operator will as instantly assume its normal position, thus obviating the necessity of turning the hand-wheel *i* to perform the same operation. Spring *k* also serves the purpose of compensating for wear in screw *g* and strap *f*, and retains screw *g* in its proper place in journal-box *h* by always keeping the hub of hand-wheel *i* in contact with the side of journal-box *h* by its elastic force, which it exerts between journal-box *h* and the end of strap *f*, as shown in Fig. 3. Hopper-bottom *a'* is reduced in thickness at its lower edge to receive slide or gate *c*, as shown in Figs. 1, 3, and 7.

There is attached to slide or gate *c* and held to place by means of the hooks or stirrups *s s s*, being integral to gate *c*, the agitator *n*, as shown in Figs. 1, 3, and 7, which is provided with teeth *n'*, projecting up into the hopper, as shown in Figs. 1 and 7, for the purpose of stirring or agitating the grain or seed, thus insuring a more steady uniform flow of grain or seed to the sieves through the opening afforded by the proper adjustment of gate *c*. Said agitator has an arm *x* inte-



grally attached at its end, as shown in Fig. 3, which is provided with a slot, by which means said agitator receives a longitudinal reciprocating motion through the elbow-crank *m*, said crank being pivotally adapted to work in slot of arm *x*, and also being pivotally attached to bottom *a'* by means of the cap *d*. Said cap has a pivotal projection extending through elbow-crank *m* and embedded in bottom *a'*, the same as shown at P, Fig. 7. The slot in arm *x* is for the purpose of allowing agitator *n* to take the different positions which slide or gate *c* is subjected to in its adjustment, while the agitator *n* receives at all times the same reciprocating motion. The elbow-crank *m* receives its motion by means of the connecting-rod *r*, Figs. 1 and 3, which is suitably attached to side of upper shoe D, as shown in Fig. 1. The caps *d* and *d'*, previously spoken of as having the pivotal projections which pass through and retain arms *e e* and elbow-crank *m* in position on bottom *a'*, are secured to bottom *a'* by means of a single screw to each cap. Thus it will be seen that only two screws are required to firmly secure the combined mechanism of the feed-gate *c* and agitator *n* to bottom *a'*. Upper shoe D, which is shown in longitudinal section in Fig. 1, is adapted to carry one or more sieves at the same time, which may be retained in any desired position, either horizontal or inclined. Said shoe is constructed with a hopper-bottom, with an opening at *l* for the discharge of grain or seed to the extreme upper end of graders *o* and *o'*, contained in lower shoe E.

With the upper shoe constructed with a hopper-bottom, as in my device, all grain or seed is admitted to the extreme upper end of the screens or graders and is forced to travel the entire length of the screens, thereby increasing the screening capacity. Upper shoe D is also provided with an auxiliary or chassing shoe C, which is adapted to be retained in any desired position, the same as the sieves. When needed, said chassing-shoe is also constructed with a hopper-bottom, similar to shoe D, with an opening at *z*. There is also provided in upper shoe D a wind-board *w*, which is adapted to take different positions in its adjustment for the purpose of increasing or diminishing the outlet for the escape of the wind-blast when chassing-shoe is used, or when necessary it may be closed up close under the sieves when chassing-shoe C is removed, thus forcing all the blast up through the sieves for the purpose of cleaning light seeds. By this method of forcing the wind-blast up through the sieves the chaff and light stuff are lifted up off the sieves, while the seed is allowed to pass down through, thus avoiding the liability of blowing over so much seed as when the blast is allowed to pass out through the sieves longitudinally.

When using chassing-shoe C, the grain is admitted onto the sieve or sieves, retained

above said shoe, and first screened of all the large coarse filth usually found in grains, the coarse stuff passing over the sieves to rear of mill, while the grain passes through the sieves onto the bottom of chassing-shoe C, and, passing out through the opening at *z*, is subjected to a strong sharp wind-blast from the fan in the direction of the arrows, and carries with it all such light seeds as chass, dust, &c., and conveys the same out through the opening afforded by the proper adjustment of wind-board *w*, all of which is shown in Fig. 1.

Upper shoe D is supported at its rear end by the spring-supports F, Figs. 1 and 6, which are constructed with coils near each end, the coils acting in the capacity of pivotal joints as they coil and uncoil as the shoe D is vibrated back and forth. Said spring-supports are rigidly secured to side casings B, and also to sides of shoe D, as shown in Fig. 6.

The rock-shaft II, Figs. 1 and 2, passes entirely across the mill laterally, and is pivotally connected to side casings B B by means of the pivotal boxes *t t*, as shown in Fig. 2. Said rock-shaft is for the purpose of pivotally supporting, by means of the arms *u u*, extending upward near each end, the front end of upper shoe D, through which said shoe receives a longitudinal vibrating motion. Said rock-shaft is also provided with an arm *v* at its center longitudinally extending downward, the end of which is adapted to engage in the socket *v'*, which is secured to the transverse brace-piece *w* of lower shoe E, through which said shoe receives a longitudinal vibrating motion, as shown in Figs. 1 and 2. The arm *y* of rock-shaft II, which extends out through side casing B, as shown in Fig. 2, is adapted to receive the connecting-rod *q*, as shown in Fig. 1, through which said rock-shaft receives its motion.

It will be noticed that the shoes D and E are connected directly to the arms of the rock-shaft II without the use of toggle links or joints, which are commonly used where rock-shafts are employed for the purpose of vibrating the shoes of grain-separators.

Connecting-rod *q*, previously mentioned, is pivotally connected to the crank-pin disk L, contained in crank-wheel I, said crank-wheel being provided with the projecting rim G and the openings or recesses M and M', which is secured to the revolving fan-shaft, Fig. 1, the dotted circle in Fig. 4 indicating the centrally-located hole for that purpose, which is also shown in the section at Fig. 8, and is also the axis around which wheel I and disk L revolve. Crank-pin disk L is pivotally connected to wheel I at *j*, and is held in position by means of the screw *j'*, which is adapted to engage in the notches of disk L, as shown in Figs. 4 and 8, by which means said disk is adjusted to throw the crank-pin either to or from the center of axis, thus giving, through the connecting-rods *q*, by means of the rock-shaft II, a longer or shorter vibrating motion to shoes D and E, as may be desired.



The lower shoe E, Figs. 1 and 2, previously referred to, is adapted to carry one or more screens or graders *o* and *o'* at the same time, and to receive different degrees of pitch or slant, as shown in Fig. 1. Said lower shoe is provided with an opening U at the lower extremity of grader *o'*, Fig. 1, for the purpose of discharging the grain or seed which passes over grader *o'* into grain-box K', as in Fig. 1, while the grain or seed which passes over grader *o* falls in front of mill, by which means the two grades are kept separate.

The adjustable grain-board N, which is pivotally attached to lower shoe E at T, is for the purpose, when used in the position as shown in Fig. 1, of conveying the grain or seed which passes through the lower half of grader *o'* to grain-box K, as shown in Fig. 1. When the grain-board N is closed up and held in position by the button *a*<sup>2</sup>, as in Fig. 5, and the lower end of grader *o'* in shoe E, Fig. 1, is raised on top of the transverse brace *c*<sup>2</sup> for the purpose of delivering the grain passing over said grader in front of mill, then the grain or seed passing through the lower half of grader *o'* is discharged into grain-box K through the opening N', as shown in Fig. 5.

Having thus fully described my invention and set forth its advantages, what I claim as new, and desire to secure by Letters Patent, is—

1. In a grain and seed separator of the character herein described, the combination of the hopper-bottom *a'*, the slide or gate *c*, the arms *e e*, pivotally attached thereto, the caps *d* and *d'*, having pivoted projections P, the connecting-strap *f*, pivotally connected to

arms *e e*, the screw *g*, with a threaded portion to engage in end of strap *f*, journal-box *h*, spring *k*, and hand-wheel *i*, all substantially as shown, and for the purpose as set forth.

2. In a grain and seed separator of the character herein described, the combination of hopper-bottom *a'*, the slide or gate *c*, having hooks or stirrups *s s s*, and the agitator *n*, having teeth *n'*, the slotted arm *x*, the elbow-crank *m*, pivotally adapted to work in slot of arm *x*, cap *d*, and connecting-rod *r*, all for the purpose as shown and described.

3. In a grain and seed separator, the shoe D, constructed with a hopper-bottom provided with the opening *l* and wind-board *w*, the chassing-shoe C, also constructed with a hopper-bottom and provided with the opening *z*, in combination, substantially as shown and described.

4. In a grain and seed separator, the crank-wheel I, provided with the projecting rim G and openings or recesses M and M', the crank-pin disk L, having a pivotal bearing at *j*, and the set-screw *j'*, in combination, as shown and described.

5. In a grain and seed separator, the combination of shoe E, having the grain-board N pivotally attached at T, and held in one of its positions by button *a*<sup>2</sup>, the rock-shaft H, having pivotal bearings at each end and provided with the centrally-located arm *v*, socket *v'*, the boxes *t t*, and arm *y*, all substantially as shown and specified.

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Witnesses:

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