(No Model.)

2 Sheets—Sheet 1.

R. BRAND.

GRAIN SEPARATOR.

No. 308,650. Patented Dec. 2, 1884.

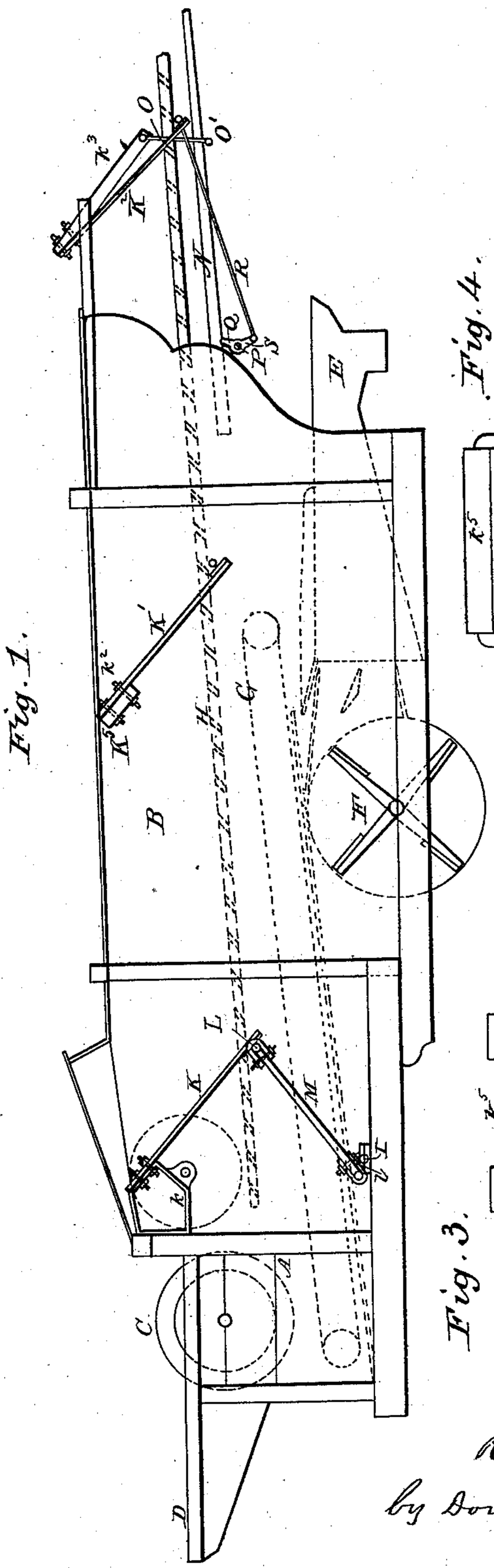

Fig. 1.

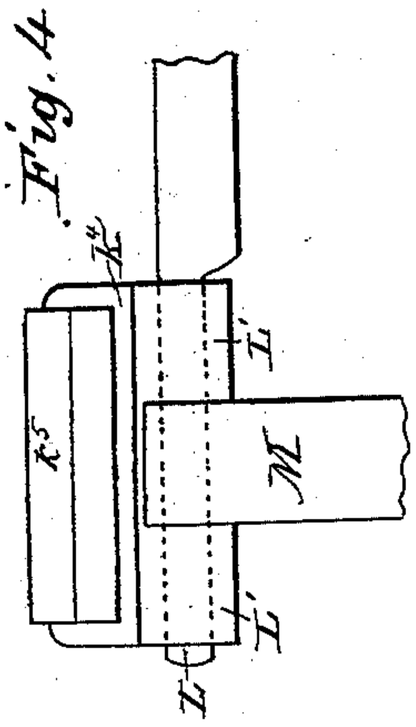

Fig. 4.

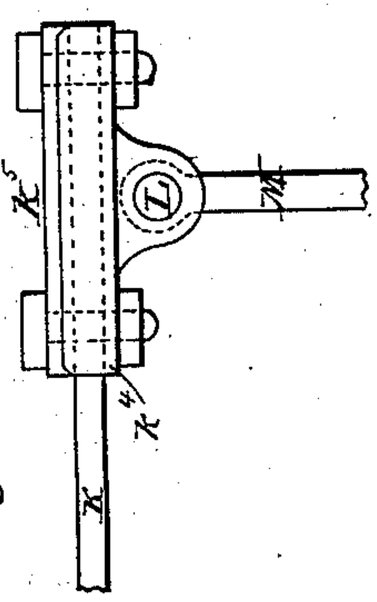

Fig. 3.

Witnesses:

W. B. Masson.

J. S. Baker.

Inventor:

Robert Brand

by Doubleday and Bliss

attys

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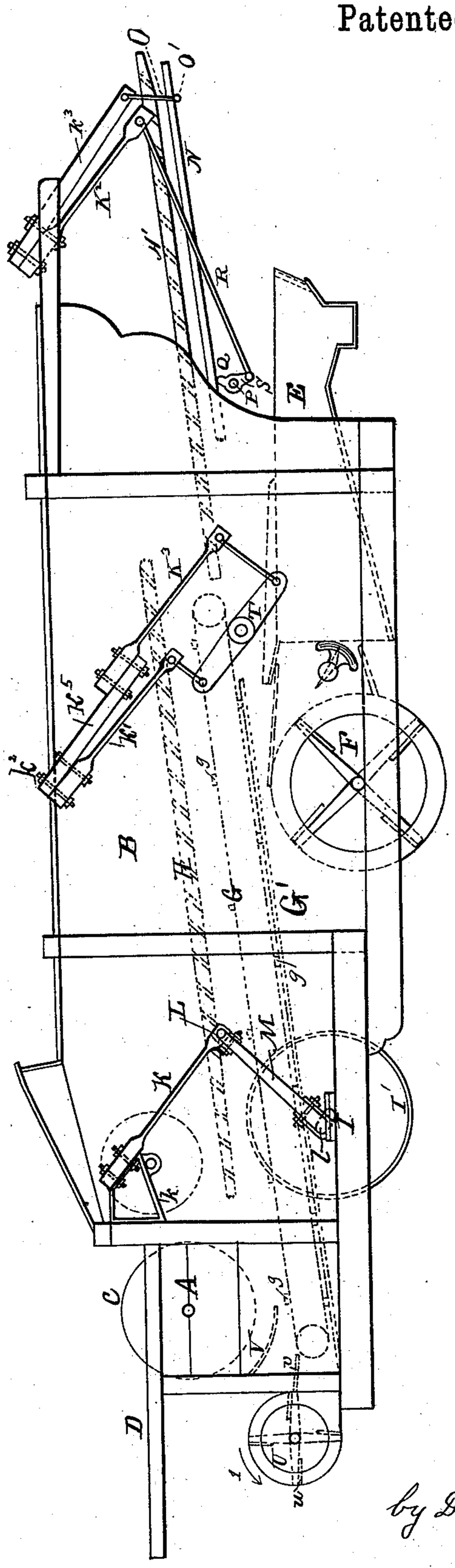

Fig. 2.

Fig. 5.

Fig. 6

Witnesses:
W. B. Masson.
J. S. Barker

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Robert Brand
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UNITED STATES PATENT OFFICE.

ROBERT BRAND, OF STILLWATER, MINNESOTA, ASSIGNOR TO THE NORTH WESTERN MANUFACTURING AND CAR COMPANY, OF SAME PLACE.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 308,650, dated December 2, 1884.

Application filed January 20, 1881. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BRAND, a citizen of the United States of America, residing at the city of Stillwater, in the county of Washington and State of Minnesota, have invented certain new and useful Improvements in Grain-Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, 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, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of a thrashing-machine and separator embodying my improvements. Fig. 2 is a side elevation of a machine of a slightly-modified form. Fig. 3 is a view of part of the pitman and one of the springs. Fig. 4 is an end view of the same. Figs. 5 and 6 show forms of spring.

A represents the frame of the thrasher; C, the thrashing-cylinder; D, the feed-chute; E, the shoe; F, the winnower-fan, and G the grain-rake, all of which parts may be of the ordinary construction.

H represents the separating-table, which receives the straw immediately after it leaves the cylinder. It is preferably slatted, as shown in dotted lines, and as the straw passes over it longitudinally the grain is jarred and shaken therefrom and drops through the table upon the rake G, which traverses the upper surface of a grain-table, G′, and conveys to the winnower the grain which falls through the slatted table, as is usual in this class of machines.

K K′ are strong springs situated in inclined positions and secured at their upper ends to the upper part of the frame of the machine, one near the front end of said machine and the other somewhat in rear of the center thereof. They may be fastened in place by means of brackets *k* or cleats K^5 and bolts, as shown at k^2. The springs are inclined downwardly and rearwardly, as shown, and are of such stiffness that they will support the weight of the shaker upon their outer ends without being deflected to such extent as to permit the momentum acquired by the table in its downward movement to produce a heavy blow or concussion upon the machine when the table has reached the limit of its downward movement. At their lower ends they are connected to the separating-table H by means of studs or shafts L.

M is a pitman connected with the separating-table at or near the point of attachment of the front spring, K. It is reciprocated by means of a crank at *l*, carried by a transverse shaft, I, which latter is rotated by the wheel I′, receiving motion from the cylinder-shaft. The springs K K′ should be inclined at such an angle as to give the table (when moved by the pitman M) the proper upward-and-rearward and forward-and-downward motion to sufficiently toss and agitate the straw, and so as to allow the table as it rises to meet the straw while the latter is falling, and at the same time convey the straw toward the rear end of the machine. I find that the springs greatly aid the labor of the pitman in moving the separating-table, and especially when the table is at either the highest or lowest point. They also prevent the great jarring and straining experienced when the table is moved by the ordinary cranks. The springs are set so that they will rise less from the center than they fall, and when so arranged the momentum of the table will of itself almost carry it to the highest and lowest points, so that most of the power lost in stopping the table when cranks alone are used is saved in this machine. The springs are adjustable longitudinally, and by such adjustment the throw of the table can be increased or lessened, so as to discharge the straw quicker or retard it longer. The springs are preferably made of wood, and are tapered, as shown, this shape permitting them to curve throughout their entire length, which makes them more durable.

In Fig. 1 the separating-table H extends continuously from a point near the cylinder to a point in rear of the machine. Beneath the rear end of the separating-table a returning-table, N, is mounted, which catches the grain from the outer end of the separating-table and returns it to the shoe.

K^2 is a third spring secured to the frame of

the machine at the rear end, and connected to the outer end of the separating-table in the manner already described for the other springs.

The returning-table N is supported by means of links O, pivoted at O′ to the table N, and also pivoted to an arm or bracket, k^3.

P is a shaft mounted in the frame-work at the rear end of the machine, beneath the front end of the table N. The shaft carries one or more eccentrics or crank-arms, Q, bearing against the returning-table.

R is a link or rod connected with the spring K^2, and with an eccentric, S, projecting from shaft P. By these devices a reciprocating motion is transmitted from the separating-table to the returning-table N, said motion being the reverse of that of the separating-table, it being readily understood from an examination of the drawings that when the returning-table is moving forward the rear part of the separating-table (to which it is attached) is moving rearward, and vice versa.

In Fig. 2 the separating-table is formed in two sections, H and H′, this construction of table producing a better separation under many circumstances than is attainable by one continuous table. Moreover, the inclination of the separating-table can be varied to a greater extent when constructed in sections than when continuous, so that the straw can, when necessary, be retained on the table a longer time. The falling of the straw from one section of the table to another insures a separation by means of the shock or jar experienced in the fall. With this construction a fourth spring, K^3, is employed in rear of the second spring, K′, and connected to the front end of the rear section of the table.

T is a walking-beam which, by rods or links, is connected at one end to the spring K, and at the other end with the spring K^3. It will be seen that by these devices a rearward motion of the front section of the table causes a forward motion of the rear section, and vice versa. As the motion of the rear section of the table is the reverse of that of the front section, and as the latter section is below the former, there results a rolling and falling movement of the straw, which disintegrates the bunches and greatly aids the separation.

In front of the thrasher-frame A a fan, U, is placed at a point below the thrashing-cylinder. It is arranged to force air into the machine through the space between the grain-rake and the cylinder, the air-blast in this instance passing readily through the spaces between the slats of the rake and thence through the slatted table and the space between the adjacent ends of the parts H H′ of the table shown in Fig. 2.

V is a shield beneath the cylinder, which prevents the blast from the fan from passing up into the cylinder, the wind-board *v* acting conjointly with the shield V, to insure that the blast produced by the vanes *u* of the fan, when revolving in the direction indicated by the arrow 1, Fig. 2, shall be forced in between the grain-table G′ and the slatted separating-table, the blast passing freely through the spaces between the slats *g* of the grain-rake. The object of the fan is to assist the separation of the grain from the straw. The current of air passes upward through the separating-table, lifting and separating the straw in such manner that the grain can easily fall from it. This fan is of great value when combined with a separating-table formed in sections, as shown in Fig. 2, as the air acts upon the straw as it is falling from one section to the other and aids largely in the separating. This fan also relieves the sieves of the shoe of much of their labor, as it prevents much of the straw and chaff from falling, which usually passes through the separating-table, and is carried by the grain-rake to the riddles. Moreover, as the grain and other materials are being carried by the rake to the riddles, the fan operates to separate all bunches of straw thoroughly, and to distribute the material evenly over the riddles. The springs are so set that they support the weight of the table at the time the crank *l* is passing its lowest point. They may be made adjustable by providing them with slots adapted to receive the bolts at k^2, as shown in Fig. 5. When the spring is made of one thickness throughout, as shown in Figs. 1 and 3, it is connected with the pitman by means of clamping-plates k^4 k^5 and bolts k^6. The spring may be made adjustable by providing it with slots, as shown in Fig. 6. A bearing for the stud or shaft L is formed in brackets L′ L′, which are cast with the plate k^4.

I am aware that a fan has been heretofore employed to force a current of air through the mingled mass of straw and grain while such straw and grain is being moved over the flat grain-table, and that in such earlier construction the separating-table was formed in two sections, the front end of the rear section being lower than the rear end of the front section, so that the air-current would pass through the grain and straw as it fell from one section of the table to the other; but in such prior construction the fan was arranged in close proximity to the space through which the grain fell from one section of the separating-table to the other. Hence the air-current did not act upon the grain, which, after falling through the first section of the separating-table, was being carried to the winnower; nor in such earlier constructions was the air-blast compelled to pass between an imperforate grain-table and a slatted separating-table extending to that point where it was discharged between the two ends of the sections of the grain-table.

I am aware of the fact that heretofore use has been made in clover-hulling machines of a table which received the straw from the cylinder, and was adapted to be reciprocated, in combination with a lever of the character of a

walking-beam, situated in central vertical longitudinal plane of said table, one end of said lever being connected with the aforesaid table, and the other with a screen or sieve situated below the table, said screen or sieve operating upon the material which passes through the table.

I am also aware of the fact that heretofore use has been made of an inner grain-table and an outer grain-table, in combination with a continuously-revolving crank-shaft in proximity to the thrashing-cylinder, with long pitmen running from said shaft backward, one to the rear end of the inner table, and the other to the inner end of the rear table.

I do not claim, broadly, a walking-beam or lever of that character for connecting two reciprocating devices; nor do I claim, broadly, two oppositely-reciprocating sections of a separating-table; but in my construction there are marked advantages, incident to the employment of the walking-beams, when arranged as I have shown. In neither of the aforesaid constructions heretofore known has there been placed below the inner separating-table an independently-acting mechanism for carrying the grain backward to the shoe. When such a mechanism is used, it is in practice impossible to employ either the centrally-arranged long pitmen or the single centrally-arranged walking-beam above referred to.

I avoid entirely any interference with the operation of the independently-acting mechanism for conveying backwardly the grain, and allow sufficient room for said mechanism below the table by arranging the pitmen, which convey power from the crank-shaft to the tables, outside of the side planes of the tables, and similarly arranging the walking-beams or levers, which insure the proper reciprocation of the separating-table, one of said walking-beams or levers connecting one of the rear corners of the inner table with the inner corner of the outer table, and the other connecting the corresponding corners of the tables upon the opposite side of the machine.

I do not herein claim the combinations specifically set forth in my other application, No. 81,799, preferring to claim herein all matters which are common to the two applications.

What I claim is—

1. The combination of the separating-table H, its inclined supporting-springs, the crank and pitman connected to the table near its front end, the returning-table supported at the rear end of the separating-table upon a rock-shaft and vibrating links, and a link or pitman connecting said rock-shaft with the rear end of the separating-table, substantially as set forth.

2. The combination, with the shoe and the separating-table extending beyond the rear of the machine, of the return-table N, extending beyond the rear of the machine, the crank Q, and the spring K, arranged to reciprocate the separating-table and the return-table in opposite directions, as set forth.

3. The combination of the following elements, namely: the front slatted section, H, of the separating-table, the grain-table below said section; the grain-rake G, the rear section, H′, of the separating-table having its inner end lower than the outer end of the front section, and the fan U, arranged to force a current of air between the front slatted section and the grain-table G′, and against the straw as it falls from one section to the other, as described.

4. The combination, in a grain thrasher and separator, of the following elements, namely: a thrashing-cylinder and concave, a slatted separating-table, a grain-carrier below the separating-table, a fan below the concave adapted to force a blast of air between the separating-table and the grain-carrier, and a shield interposed between the fan and the concave to properly direct the air-blast, substantially as set forth.

5. In a thrashing and separating machine, the combination of an inner straw-shaker, a rear straw-shaker, which receives the straw that passes over the end of the inner shaker, an independently-acting mechanism below the inner table for conveying the grain rearward, a crank-shaft, pitmen operated by said shaft for moving the tables, and situated outside of the side planes of the table, and walking-beams or rocking levers interposed between the adjacent ends of the tables to insure opposite reciprocation of the tables, and situated outside of the side planes of the tables, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT BRAND.

Witnesses:
N. S. GOODHUE,
L. C. PROCTOR.