

(No Model.)

2 Sheets—Sheet 1.

R. BRAND.
GRAIN SEPARATOR.

No. 308,651.

Patented Dec. 2, 1884.

Fig. 1.

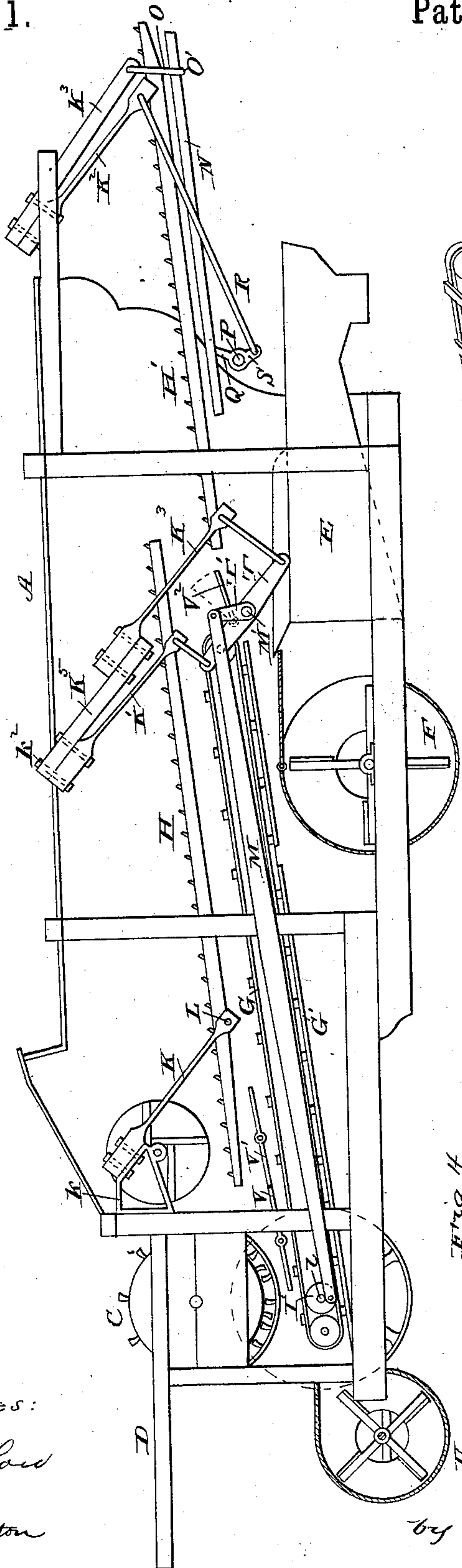
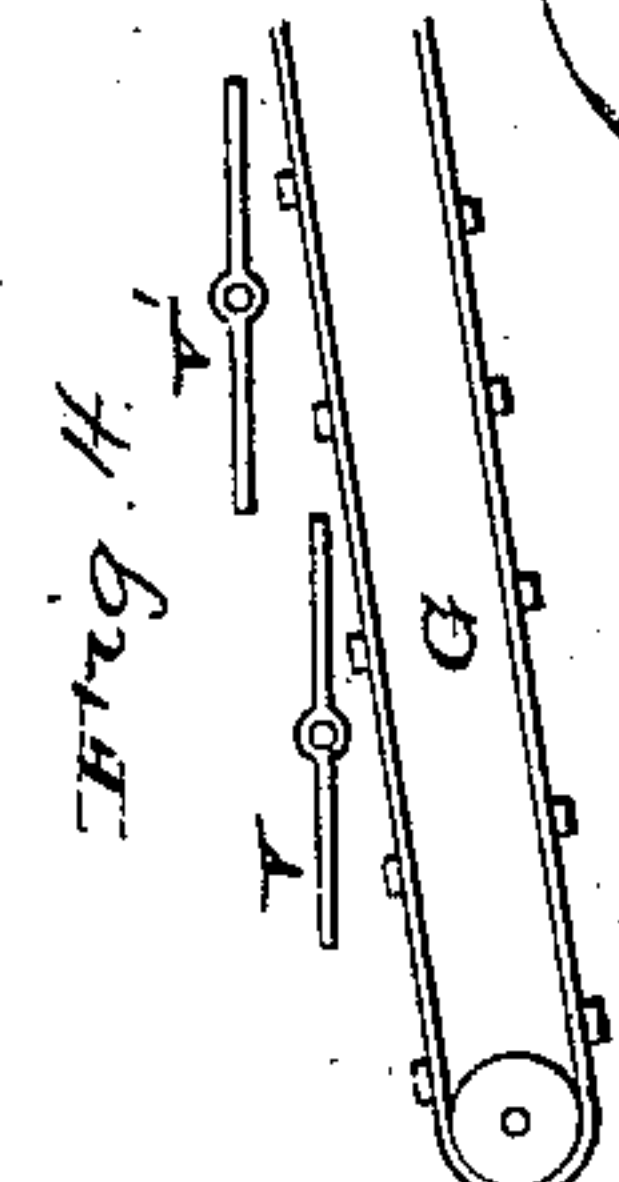
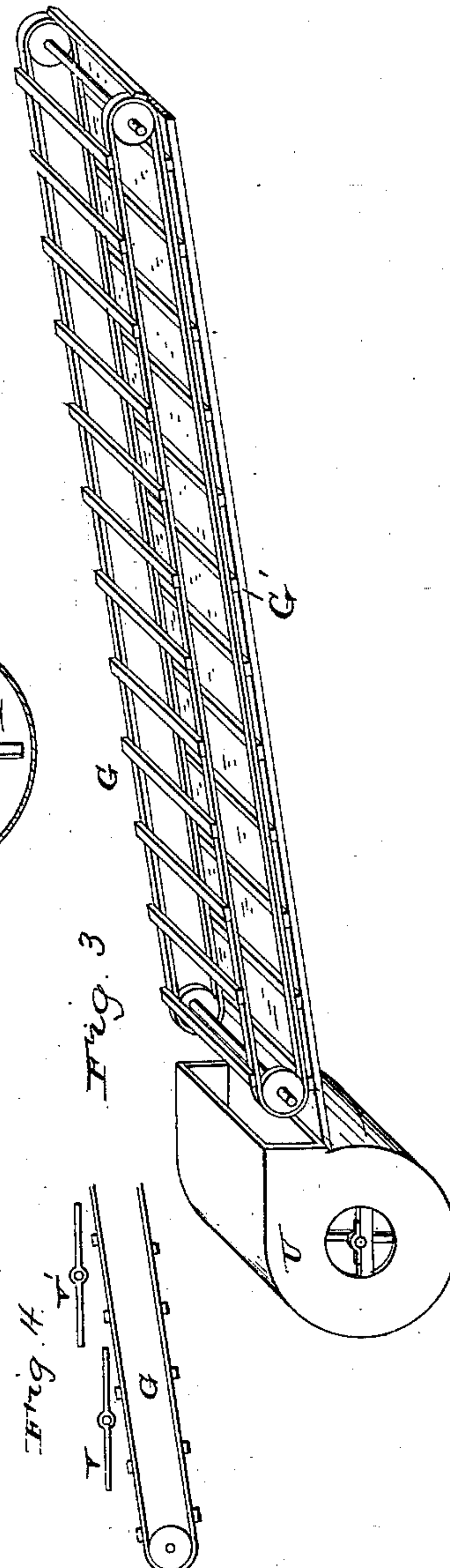


Fig. 3.



Witnesses:

N. N. Law
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Inventor:

Robert Brand
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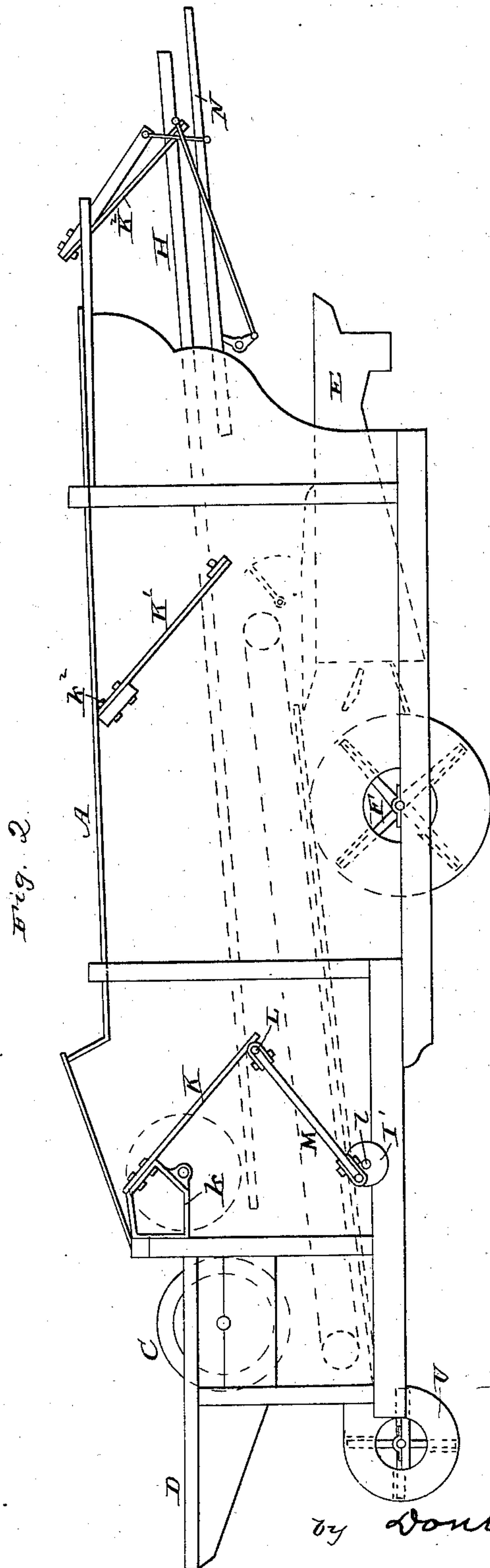
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N. N. Low
A. J. Houghton.

Inventor:-

Robert Brand

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UNITED STATES PATENT OFFICE.

ROBERT BRAND, OF OAKLAND, CAL., ASSIGNOR TO THE NORTH WESTERN MANUFACTURING AND CAR COMPANY, OF STILLWATER, MINN.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 308,651, dated December 2, 1884.

Application filed January 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BRAND, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Grain-Separators, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a side elevation of a thrashing-machine and separator embodying my improvements, the side of the casing being removed in order to show the relation of the parts inside of said casing to those outside. Fig. 2 is an outside view of a modified form. Figs. 3 and 4 are detailed views.

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

H H' represent the separating-table, which receives the straw immediately after it leaves the cylinder. It is preferably slatted, and as the straw passes over it longitudinally the grain is jarred and shaken therefrom and dropped through the table upon the grain-table G', over which travels the rake G, conveying toward the winnow-fan the grain which falls through the slatted table.

K K' are inclined springs secured to the separating-table at the lower ends and at their upper ends secured to the upper part of the frame of the machine, one near the front end and the other at or a little in rear of the center.

They are fastened in place by means of metallic 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 lower 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 throw. At their lower ends they are connected to the separating-table H by means of shafts or studs L.

In the construction shown in Fig. 1 the sepa-

rating-table is formed in two sections, H and H', this construction of the table producing a better separation, under many circumstances, than is attainable by one continuous table. The inclination of the table can be varied to a greater extent when constructed thus in sections than when continuous, so that the straw can, when necessary, be kept on the table a longer or shorter time, at will. The dropping of the straw from one section of the table to the other insures a separation by means of the shock or jarring experienced in the fall. With this construction another spring at or near the center of the machine is required, such a spring being shown at K^3 . It is in rear of the spring K' and connected to the front end of the rear section of the table.

K^2 is a fourth spring secured to the frame of the machine at the rear end, and connected to the outer end of the rear section of the separating-table in the manner already described for the other springs. These springs K K' K^2 K^3 should be inclined at such an angle as to give the table (when moved by the reciprocating devices) 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 to convey the straw toward the rear end of the machine.

I find that the springs greatly aid the labor of the pitman (to be described) 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 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 preferably tapered, as shown, this shape permitting them to curve throughout their length, so that they are much more durable.

M' is a shaft, either mounted in one side of the casing or extended continuously across from side to side thereof.

T is a walking-beam, keyed or otherwise secured to the shaft M', and connected at its ends by rods or links to the sections H H' of the separating-table. Preferably, the rods or links of the walking-beams are attached to the table directly at the lower ends of the springs and in such manner as to be tangential to the paths through which said lower ends of the springs move.

T' is a crank-arm, also secured to the shaft M', and M is a pitman pivoted to said crank T'. At the front end it is connected to a crank or crank-wheel, I', carried by a shaft, l. At the opposite end this shaft carries a wheel which meshes with a pinion on the cylinder-shaft, or is otherwise driven by said cylinder-shaft. When the shaft l is rotated, the pitman M, through the walking-beam and links, produces the necessary movements of the sections of the separating-table. By these devices a rearward motion of the front section of the table is caused at the same time that there is produced 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 movement of the straw when it falls, which disintegrates the bunches and greatly aids the separation. By applying the power thus through the medium of the walking-beam to both the sections it can be imparted to them with greater advantage than when applied to one of them, and by that one transmitted to the other through the walking-beam. In the latter case the momentum of the rear section tends to throw it too far relatively to the front section, and does not return properly relatively thereto.

When the parts are driven in the manner I have shown, the power can be uniformly and evenly imparted to the two sections and the movements of one will be proper relatively to the other. Beneath the rear section there is a returning-table, N, supported by means of links O, pivoted at O' to the table N, and also pivoted to an arm or bracket, K³.

P is a shaft mounted in the frame-work at the inner end of the table N. This 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 K² 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 front of the thrasher-frame, or in the front portion thereof, there is placed a fan, U, below the thrashing-cylinder. It is arranged to force air into the machine in such

manner as to carry the blast rearward and somewhat downward in order to have the air-current pass along the grain-table and below or through the grain-rake. When the parts are arranged substantially as shown, this fan forces a great portion of the chaff and straw from the grain outward, and relieves the shoe of one-half or more than one-half its labor. Moreover, it assists the grain-rake, as it not only helps to carry the kernels of grain upward, but also forces the chaff out, leaving the rake to act with but comparatively little resistance. Again, these devices can be used to assist in separating the heavier grain from the lighter, for by having an aperture or apertures in the grain-table, as at g, the blast can be so regulated as to allow the heavier grain or grains, to fall through such aperture or apertures, and at the same time carry the lighter ones beyond. Preferably, I employ one or more shields or deflectors, V V', beneath the cylinder, which operates to guide the blast inward or downward sufficiently to prevent it from rising too suddenly and freely through the separating-table. When a table of the character shown in Fig. 1 is employed, having two sections in different planes, the fan in front is also advantageous, in that the blast can be caused to loosen up the straw at or near the rear end of the first section of the table and to prevent a clogging of it on the rear section. To effect this upward turning at the point mentioned I employ a supplemental deflector or blast-board, V², situated at or near the point where the sections of the table overlap. By means of this the air can be utilized in the manner last mentioned, and at the same time can be prevented from forcing any of the grain or desirable seed out from the machine over the rear section. However, I do not limit myself to the exact adjustment shown of the supplemental deflector or blast-board, as it may be used to great effect if so arranged as to throw the air through the straw while it is falling from one section to the other, and when the blast is thus directed it separates the bunches of straw and distributes the material uniformly over the table.

The fan U, which I employ, is an over-acting-fan.

I am aware that use has been made in open uncovered straw-carriers of a fan so situated as that it could force a current of air through the straw as it was being carried away from the thrashing-machine, the fan being combined with an endless straw-carrier arranged with a short vertical portion, at which the straw drops from one plane of elevation or carriage to another plane, and the fan being mounted in the straw-carrier frame separate and detachable from the thrasher-frame; but in such prior construction the fan was not combined with a separating-table and inclosed within a tight casing, and so arranged as to have the air therefrom forced rearwardly through said tight casing. On the other hand

it was arranged in close proximity to the aforesaid vertical part of the carrier, where the grain fell from one section to the other.

Upon examining the drawings it will be seen that when the parts are constructed and arranged as I have shown the separating-table, the grain-table, and the shoe at the rear end of the latter table are all inclosed by the tight casing, from which it results that the blast of air is carried as a continuous current to a point considerably in rear of the shoe and the devices named. This insures that the chaff and light material caught up by the air-blast shall not be dropped in time to reach the shoe, as would be the case if the blast should pass into the open air at a nearer point. Moreover, by having the grain-table upwardly inclined somewhat there is less liability for the chaff or light material to drop into the shoe than if it were positively inclined. I prefer for most of the purposes for which these parts of the mechanism are intended to have the separating-table divided into two sections, as shown in Fig. 1, as this enables me to carry the chaff and the light material (which are passed through the first section of the separating-table) to the upper side of the outer section by blowing it between their adjacent ends, and thus have an additional safeguard against this material dropping or being deflected downward to the shoe. So far as other matters are concerned, however, I do not limit myself to the tables being divided into two sections. The fan which I employ, combined with the upwardly-rising grain-table, it will be seen, is an over-acting one—that is to say, the line of the upper part of the fan-casing converges with the line of the grain-table, the fan-blades tending to throw the air downwardly relatively to the forward end of the grain-table—and as a result the air-blast passes more closely to the grain-table throughout its entire length than is the case when an upwardly-inclined table and an underacting fan are combined. The grain-rake is skeleton—that is to say, constructed of straps and cross-bars—and it, therefore, does not interfere materially with the passage or action of the air-blast, the latter being able to catch the chaff and light material while falling through the rake and to move such materials through and regardless of it. The grain of course has a tendency to move downwardly toward the fan, and therefore (without considering the grain-rake) the table and air-blast can be so related that the gravity of the grain can be utilized to prolong the cleaning action of the fan to a greater extent than if a horizontal or downwardly-inclined table were employed.

In the construction shown in Fig. 2 the separating-table extends continuously from a point near the cylinder to a point in the rear of the machine. Beneath the rear end of the separating-table in this case there is a returning-table, as in the other. I have shown also here

another means of driving the separating-table, which can be effected by means of a shorter pitman, M, and by a transverse shaft somewhat farther back than the one shown in Fig. 1, the power-wheel of which can be driven by a belt from the cylinder-shaft or otherwise. With a construction of this sort a separating-fan, U, can be combined advantageously in some of the respects in which it can be advantageously used in the construction like that shown in Fig. 1.

I do not herein claim the following specific combinations, to wit: first, the combination of the front slatted section of the separating-table, the grain-table below said section, the grain-rake, the rear section of the separating-table having its inner end lower than the outer end of the front section, and a fan arranged to force a current of air between the front slatted section and the grain-table and against the straw as it falls from one section to the other; and, secondly, the combination of 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. These combinations I have made the subjects-matter of claims in another application heretofore filed by me, to wit, No. 24,367, filed January 20, 1881.

What I claim is—

1. In a grain thrasher and separator, the combination of the following elements, namely: a thrashing-cylinder, a concave below it, a slatted separating-table, a grain-table below the separating-table, a grain-carrier above the grain-table, a fan below the concave adapted to force a blast of air over the grain-table, and adjustable devices below the front end of the separating-table for regulating the direction of the air-blast over the grain-table, substantially as set forth.

2. The combination of the following elements, namely: the front slatted section of the separating-table, the grain-table below said section, the grain-rake, the rear section of the table having its inner end lower than the outer end of the front section, the fan at the front end of the machine adapted to force a blast of air above the grain-table, and adjustable air-guiding devices arranged, substantially as set forth, to force a current of air upward at the rear end of the front section of the separating-table, substantially as set forth.

3. The combination of the thrashing devices, the separating-table, the grain-table below the separating-table for catching the grain before it is delivered to the shoe, the fan at the front end of the machine adapted to force a blast of air over the grain-table, and a series or gang of wind-boards or blast-deflectors below the concave and the front end of the separating-table, substantially as set forth.

4. The combination of the thrashing mechanism, the separating-table which receives the straw and grain from said mechanism, the blower-fan at the front end of the machine, 5 and a hinged or adjustable blast-deflector adapted to guide the air-blast upward through said separating-table, substantially as set forth.

5. The combination of the thrashing mechanism, the separating-table consisting of an inner section and an outer section, and arranged to receive the straw and grain after leaving said mechanism, the grain-table below the separating-table, and the fan at the 15 front end of the machine adapted to force a current of air between the separating-table and the grain-table, and means for causing the current of air to pass at will, either between the ends of the two sections of the separating-table, or up through the inner section, substantially as set forth. 20

6. The combination of the thrashing mechanism, the separating devices, the upwardly-inclined grain-table, and an overacting blower-fan at the front end of the machine, adapted to force a current of air along the grain-table upwardly, substantially as set forth. 25

7. The combination of the thrashing mechanism, the separating mechanism, the grain-table below said separating mechanism, and 30

provided with an aperture for the dropping of grain, and the blower-fan arranged to force a current of air along the grain-table and over said aperture, substantially as set forth.

8. The combination of the thrashing mechanism, the reciprocating separating-table, the shoe at the rear end of the machine, the winnower-fan adjacent to the shoe, the upwardly-inclined grain-table which receives the mingled chaff and grain from the separating-table, and the overacting blower-fan at the front, adapted to force a current of air inwardly on lines converging with the grain-table from the upper side of the fan-casing, substantially as set forth. 35 40 45

9. The combination of the thrashing mechanism, the inner section of the separating-table, the outer section, the springs which support the adjacent ends of said sections, the shaft M', the reciprocating devices mounted upon said shaft and connected to both of said sections, and the pitman arranged to apply power directly to said reciprocating devices, substantially as set forth. 50

In testimony whereof I affix my signature in presence of two witnesses. 55

ROBERT BRAND.

Witnesses:

T. P. STRONG,

C. W. McLAUGHLIN.