2 Sheets—Sheet 1.

W. I. HARVEY & H. S. MITCHELL.

Grain-Separators.

No. 209,759. Patented Nov. 12, 1878.

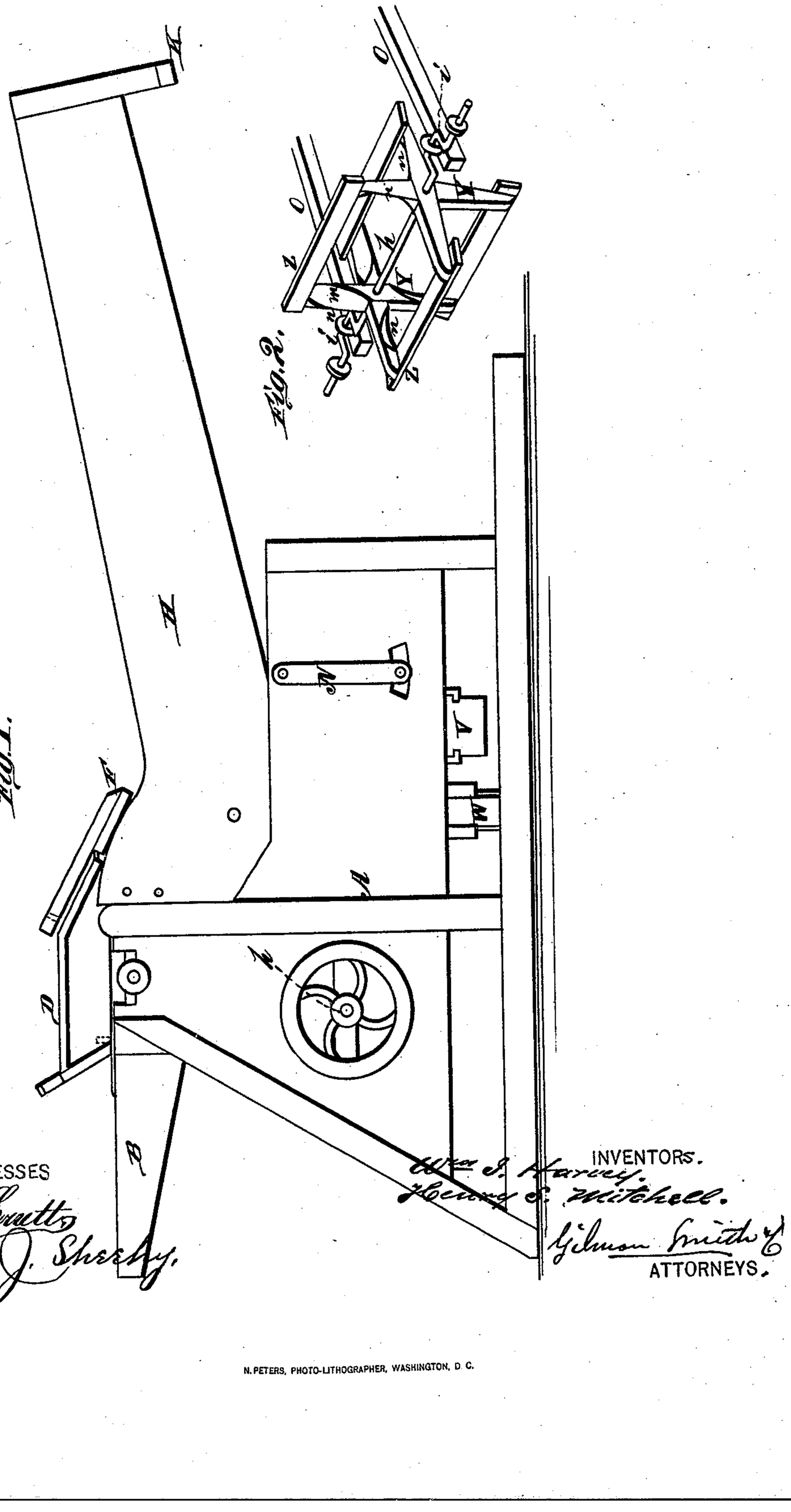

Fig. 1.

WITNESSES

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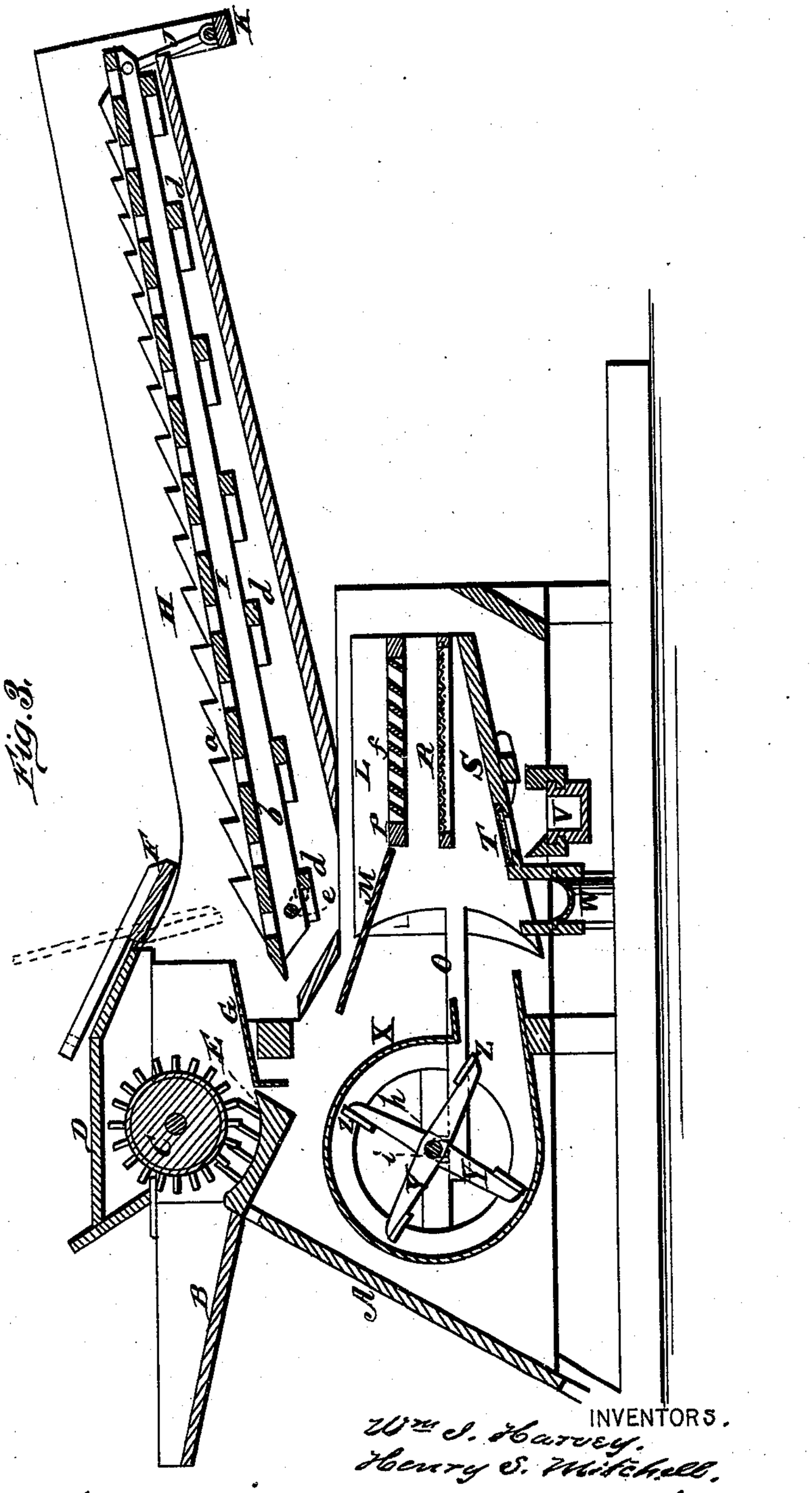

Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM I. HARVEY AND HENRY S. MITCHELL, OF LOCK HAVEN, PA.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **209,759,** dated November 12, 1878; application filed March 16, 1878.

To all whom it may concern:

Be it known that we, WILLIAM I. HARVEY and HENRY S. MITCHELL, of Lock Haven, in the county of Clinton and State of Pennsylvania, have invented a new and valuable Improvement in Grain-Separators; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side view of our grain-separator. Fig. 2 is a perspective view of a part thereof, and Fig. 3 is a longitudinal vertical sectional view thereof.

The nature of our invention consists in certain improvements in a thrashing-machine and grain-separator, as will be hereinafter more fully set forth.

The annexed drawings, to which reference is made, fully illustrate our invention.

A represents the frame-work of our machine, provided with the usual feed-table B, spiked cylinder C, and spiked concave E, said parts being constructed in any of the known and usual ways. Over the cylinder C is a casing, D, to the rear edge of which is hinged a valve, F, which retards the passage of the straw and grain from the concave, so that the thrashing-cylinder may have sufficient time to thrash out all the grain. The outer or lower end of this valve F is heavier than the forward portion handle, so that it can assume a vertical position, or nearly so, as shown by the dotted lines in the drawings.

From the concave the straw and grain pass over an apron, G, against the front end of which the valve F hangs. H represents the shaker-frame forming part of or attached to the main frame of the machine. In this frame is a shaker, I, consisting of a perforated board provided on its upper side with a series of toothed bars, *a a*, running longitudinally the entire length of the shaker.

On the under side of the shaker I are secured two longitudinal parallel bars, *b b*, and to these is secured a series of V-shaped or curved slats, *d d*, running crosswise under the shaker, with the concave edge toward winnower, to bring the grain back and deliver it in the center of the grain-hopper. The rear end of the shaker is held upon the hooked ends of a stirrup, J, which is pivoted on a cross-bar, K, secured to suitable arms below the outer or upper end of the shaker-frame H. The inner end of the shaker is connected to and operated by a crank-shaft, *e*, as shown in Fig. 3 of the drawings. By this method of suspending the shaker we remove all obstructions above the shaker, which permits an unobstructed surface for the straw.

Below the inner end of the shaker-frame is an incline or hopper, M, conducting the grain to the sieves in a shoe, L, placed in the lower portion of the main frame, said incline or hopper being attached to the shoe. This shoe is suspended near its front end in two pivoted side arms, N N, and the necessary shaking or oscillating motion is imparted to it by means of two pitmen or arms, O O, from cranks *i i* upon the fan-shaft *h*.

In the top of the shoe L is a chaffer, consisting of a frame, P, sliding in grooves in the sides of the shoe, and provided with a series of cross-slats, *f f*. These slats may be made of sheet metal, wood, or any other suitable material, and are set at an angle so as to slope back toward the fan, thus allowing the air to pass through between them without any obstruction and carry off all substance that is lighter than the grain. Below this chaffer is a screen, R, of wire-cloth, and below this screen is the grain-board S. This grain-board is provided at its lower end with a sieve, T, to separate all fine seeds from the grain and deliver them in a box, V, for that purpose in the bottom of the machine. W is a spout for carrying off the grain at the side of the machine.

The fan is constructed in the following manner: On the fan-shaft *h* are secured two or more sets of cross-arms, Y Y, halved into each other in the center. The ends of these arms are beveled on one side to receive the wings Z Z, and inward from these wings or blades the arms are formed with an inclined tapering groove, *m*, on the inner side, forming, as it were, a sharp or cutting edge, *n*, on the front of each arm. By this peculiar shape of the arms a suction is produced which throws the wind on the fan, making the required amount of wind with much less speed than with the

ordinary arms. X is the fan-case, constructed in the usual manner.

The cylinder is to be run by a belt or shaft from the power, the same as other machines for thrashing and cleaning grain.

The shaker is to be run by a cross-belt from the cylinder, and carries off the straw by its forward motion and brings the grain back to the hopper by the backward motion, the slats *d* on the under side of the shaker I doing this work. The grain then goes through the hopper and riddle, where it is cleaned, striking the board S in the bottom of the shoe, passing over the screen T to the trough V, and is then carried out at either side cleaned and screened. The fan is run by a straight belt from the cylinder.

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

The slats *d d*, made in **V** or curved form, and attached to the under side of the shaker I, for the purposes herein set forth.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

WILLIAM I. HARVEY.
HENRY S. MITCHELL.

Witnesses:
H. T. HARVEY,
J. A. RICKER.