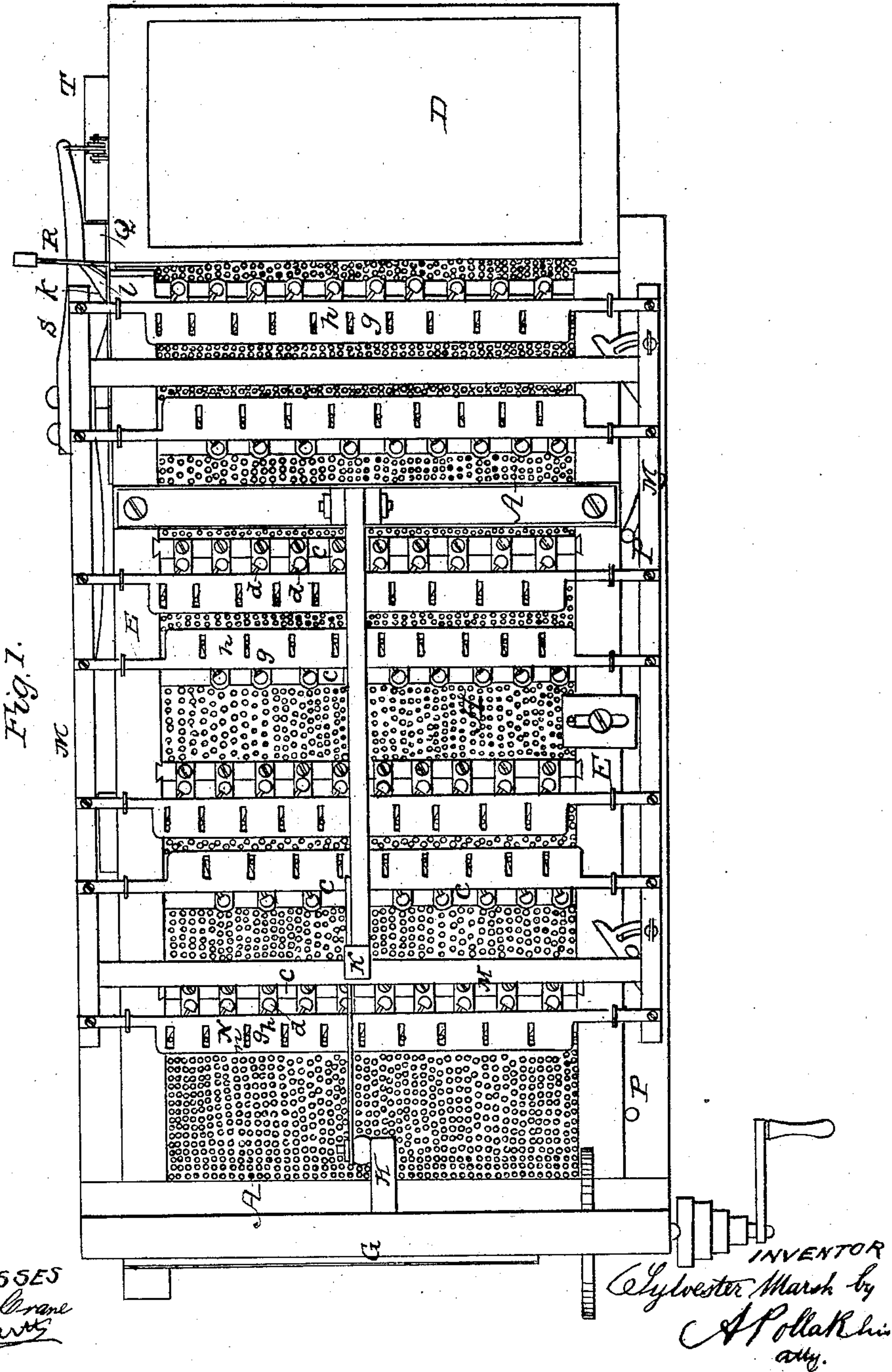


S. MARSH.  
Grain Drier.

3 Sheets—Sheet 1.

No. 25,745.

Patented Oct. 11, 1859.

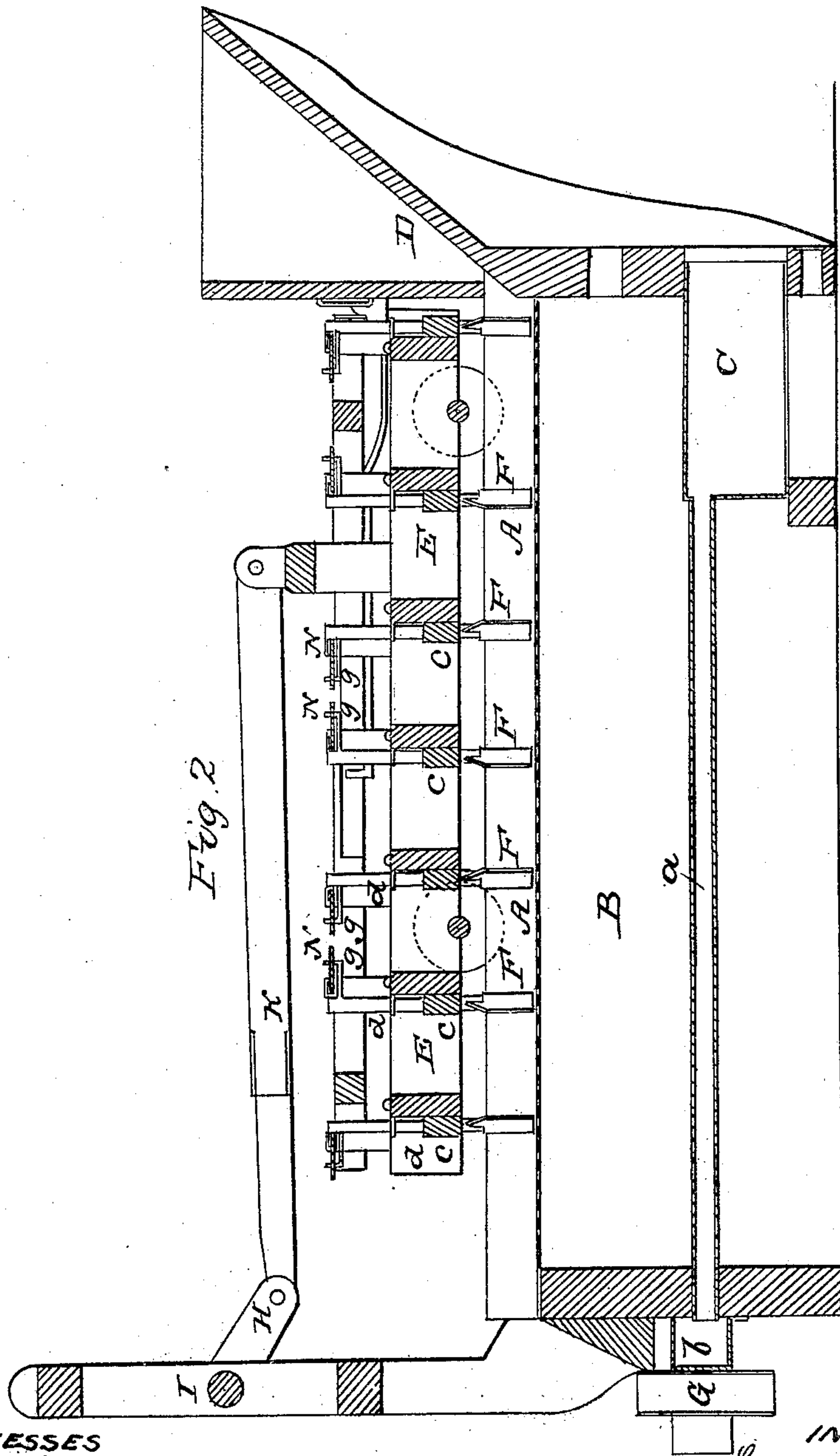


S. MARSH.  
Grain Drier.

3 Sheets—Sheet 2.

No. 25,745.

Patented Oct. 11, 1859.



WITNESSES  
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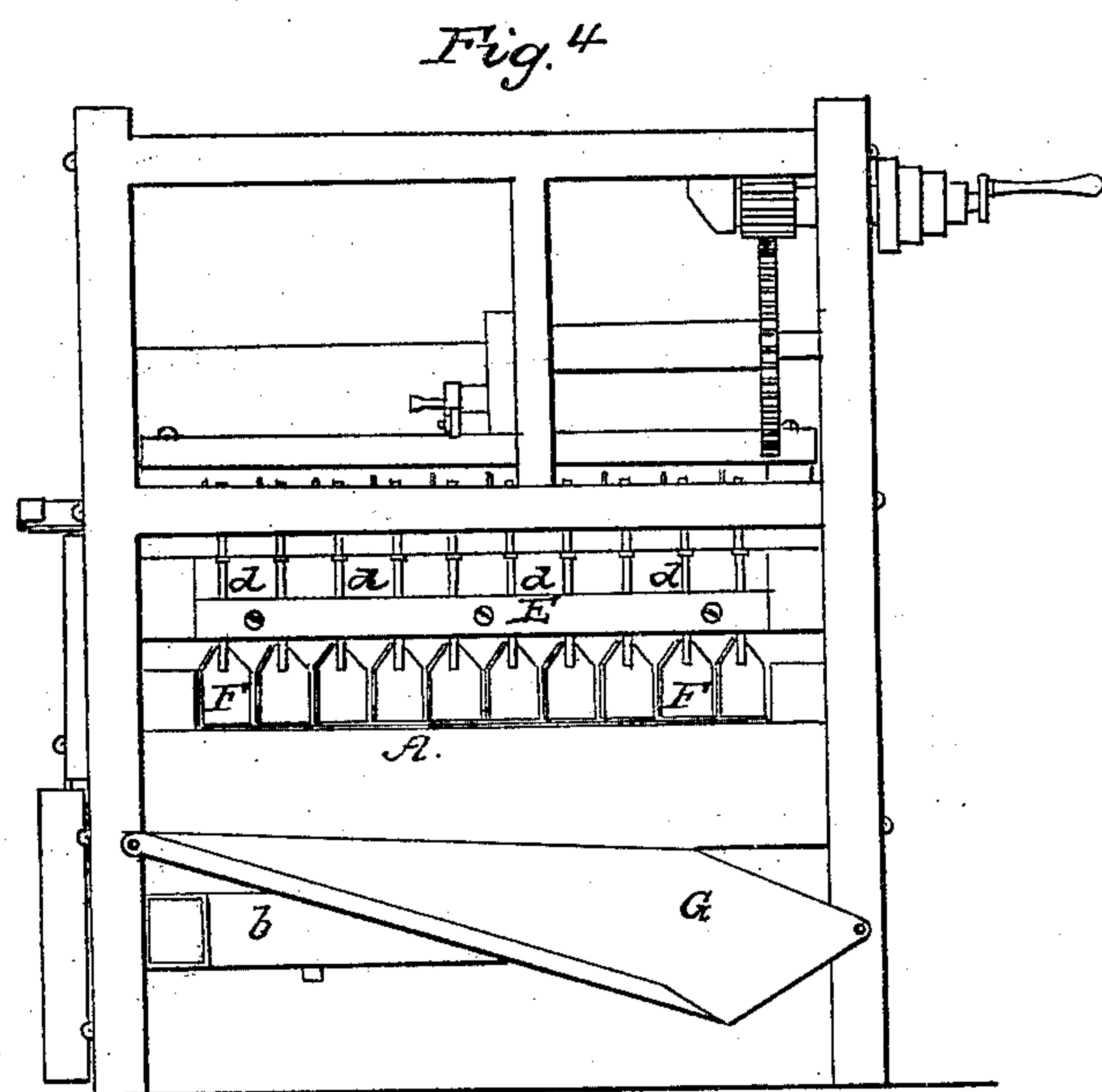
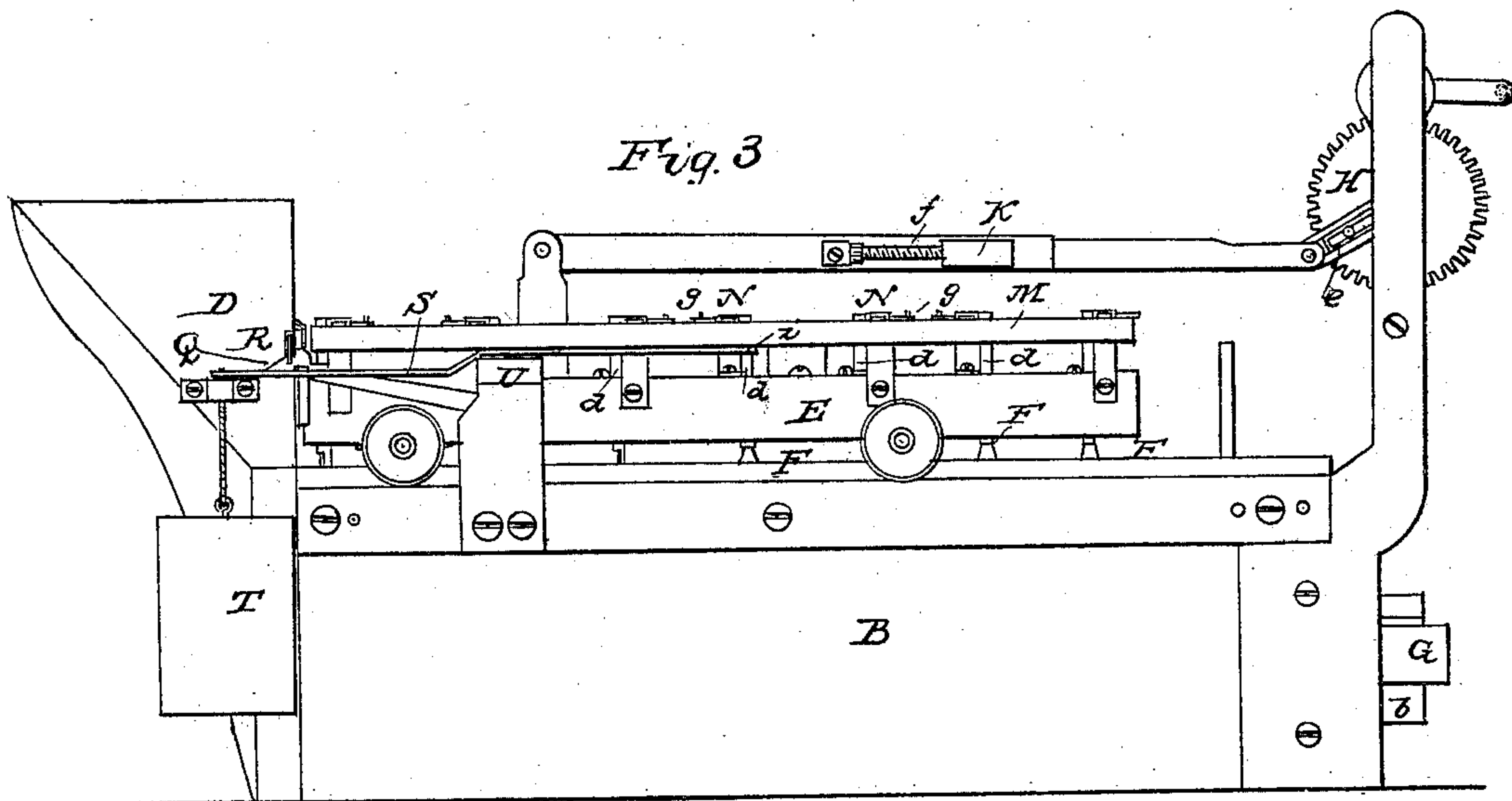
S. MARSH.

3 Sheets—Sheet 3.

Grain Drier.

No. 25,745.

Patented Oct. 11, 1859.



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# UNITED STATES PATENT OFFICE.

SYLVESTER MARSH, OF WEST ROXBURY, MASSACHUSETTS.

## APPARATUS FOR STIRRING AND DELIVERING GRAIN.

Specification of Letters Patent No. 25,745, dated October 11, 1859.

*To all whom it may concern:*

Be it known that I, SYLVESTER MARSH, of West Roxbury, in the county of Norfolk and State of Massachusetts, have invented  
5 a new and useful Grain Stirring and Delivering Attachment to Grain-Drying Apparatus; and I hereby declare the following to be a full and clear description thereof, reference being had to the accompanying  
10 drawing, which forms part of this specification, and in which—

Figure 1, represents a plan of a grain drying apparatus, with my invention applied thereto. Fig. 2, a longitudinal vertical  
15 section of the same. Fig. 3, a side view thereof; and Fig. 4 a rear or delivery end view of the same.

In drying grain by artificial heat previous to storing and on other occasions, it is desirable that the grain should be as uniformly dried as possible and that it should  
20 not be allowed to remain still or too long exposed to the heat, without being agitated, when passing through or over the drying surface or apparatus.  
25

My invention has for its object a more perfect distribution, agitation and delivery of the grain on and from the drying surface and whereby the desired result is obtained  
30 automatically and in an economical and rapid manner.

I will now proceed to describe my contrivance as applied to a grain drying surface or apparatus and for this purpose refer  
35 to the accompanying drawings wherein the portion marked A represents a horizontal reticulated bed and which constitutes the drying surface as the grain passes on to, along and over it. This bed A may be made  
40 of thin sheet metal with fine perforations or punctures made in it and of any desired length and width. Said drying surface forms the top to a hot air chamber B, which may be heated by one or more furnaces C and the latter or their smoke pipes  
45 or passages *a* terminating in a general flue *b*. The heated air ascending warms and passes through the reticulated bed or grain drying surface A.

The grain is fed on to the reticulated bed A by a hopper D, arranged at and over its one end. This hopper with its outlet or discharge may be of the width of the bed or thereabout, and its position or shape  
50 such as to cause the grain to slightly shoot forward on to the reticulated bed A.

Over the bed A, it is necessary that the grain to be dried by the heat beneath and passing through it, should be spread or distributed over the whole bed surface, and  
60 be stirred or agitated thereon and gradually or at frequently recurring intervals be worked or moved forward and as fast as dried be delivered from off said bed, as well as to guard against injury to the dried grain  
65 as to make room on the drying bed for fresh undried grain entering by the hopper at the head of the bed. To do this effectually I employ the following devices or their equivalents.  
70

At a suitable height over the bed A I arrange for reciprocating transverse in direction of the length of the bed, a truck E, the wheels of which run on suitable side rails or surfaces. The frame of this truck  
75 carries any number of cross ties *c* in or through which are hung or pass a series of vertical shanks *d* of paddles F. These paddles should be sufficiently close, each row, as when turned to occupy an extreme oblique position across the truck and over the  
80 reticulated bed against or close over which they work, they, combined, sweep over the whole width of the reticulated bed as the truck E is moved from the hopper toward  
85 the back end of the apparatus, during which traverse said paddles lie obliquely as described.

Each adjoining row of paddles should be set to occupy a reverse oblique position to  
90 the row of paddles immediately preceding them and should have their shanks or shafts arranged in lines intermediate of the shafts of the preceding ones.

In the back motion of the truck E *i. e.* 95 when moving from the rear end of the apparatus to or toward the hopper D, the position of the several paddles is changed from their oblique and sweeping set just described to an edge presentation or set, 100 and again changed to their oblique set when the truck is about to move forward. Thus, or otherwise equivalently arranged and operating, it will be obvious, that, upon the truck E, being made to reciprocate as described, the grain to be dried, will not only  
105 be leveled or spread over the reticulated bed A, but will be thrown alternately to the right and then to the left by the reversely set paddles when occupying their oblique 110 positions and moving from the hopper; and will be stirred or agitated and turned and



moved forward during such set and traverse of the paddles with their truck. It also will be seen that said grain will be further stirred by the paddles in changing their positions and that it will not be drawn back by the reverse run of the truck, as the paddles have during such latter traverse an edge presentation. In this way too a sufficiently slow yet progressive motion of the grain over the reticulated bed is made and its delivery from time to time effected at the far end of said bed where may be arranged a conveying spout G for the dried grain.

As it is only during the forward motion of the truck that the paddles operate to move the grain onward a sufficient interval of rest occurs for the heat to "get hold" upon the grain, yet not sufficient rest for the grain to become unequally heated, and the frequent changes of position which the paddles give the grain, as well by their intermittent forward stroke as by the reverse obliquity of said paddles, effectually prevent injury to the grain by its tending during the back travel of the truck when the paddles move edgewise through the grain. In this way is the grain automatically distributed and stirred, and urged forward at intervals by each advance row of paddles getting hold of it in succession, and, after it has traversed the whole length of the reticulated bed, finally delivered in a properly dried state each successive forward stroke of the truck. The truck E with its paddles F may have the reciprocating motion in direction of the length of the reticulated bed given them by means of a crank H hung on a shaft I driven by a suitable power, said crank being connected with the truck-frame by a pitman K. This pitman I prefer to attach to the wrist of the crank H by or through a slide c adjustable in direction of the throw of the crank whereby more or less stroke may be given to the truck and paddles as required.

I also prefer to make the pitman K, in two parts linked together by a connecting screw f, whereby the range of motion of the truck and paddles on or over the reticulated bed may be changed without of necessity altering the length of stroke of the truck or to suit an increase or diminution of the truck stroke as the case may be; said lengthening and shortening or adjustable pitman K, serving to set the truck with its paddles at a proper distance (according to the feed and a variety of circumstances) from the supplying hopper, or rear end of the reticulated bed, as required.

To change the action of the paddles by giving them an oblique position when the truck moves forward and an edgewise position when moving backward, as and for the purposes before described, I provide the

truck E with an upper cross-sliding frame M, arranged to act upon the paddles as follows: The shanks or shafts d of the paddles are made to carry cranks g, the wrists of which fit in the slots h of cross bars N to said frame M. Inclined planes O are provided said cross sliding frame M on its one side.

When the truck E is about finishing its forward stroke, the inclined planes O of the cross sliding frame M, strike and move against fixed stops P, which causes said frame to move crosswise, and in so moving to turn the cranks g and shift the paddles F from an oblique to an edge set or presentation for the backward travel of the truck.

The inclined planes O, when set are fixtures to the sliding frame M, but they are so connected thereto by pivot and screw and slot, as to admit of their inclination being varied to suit different degrees of obliquity given the paddles; a certain obliquity of the paddles requiring a lesser stroke of the cross sliding frame, and a different obliquity or larger stroke thereof to bring the paddles straight for the back run of the truck. Said adjustability of the inclined planes O also serves to suit alterations in the range of the truck's travel and stroke.

As the truck E approaches the limit of its back stroke, an inclined plane Q, attached to the truck on the other side and projecting from its back end, lifts a weighted catch R, that releasing a lever S causes the latter, by its clip at its one end i of the cross frame M, and by a weight T, pulling on it at the other, to suddenly throw the cross sliding frame M back to its original position and in so doing, to turn the paddles to their required oblique positions for the forward traverse of the truck. The lever S, when moved, traverses horizontally, turning on an intermediate fulcrum at V.

The weight T, as before described, serves to throw the lever to bring the cross sliding frame back. To throw the lever in the other direction so as to put in position again to be locked by the weighted catch R, till required to be released as before, said lever is made with a swell K that an inclined piece l attached to the truck, rubs against during the forward travel of the truck, and moving the lever S raises the weight T, till said lever S is locked by the weighted catch R.

Having thus fully described my improvement in grain stirring and delivering apparatus, I shall state my claims as follows:

1. The combination, with the reticulated bed, or other suitable drying table, of a reciprocating truck armed with paddles or stirrers for agitating the grain on the drying surface.

2. The arrangement, substantially as specified, of the truck paddles in rows, one in advance of the other and the paddles of each



preceding row intermediate of those next behind them.

3. Giving to the paddles of the reciprocating truck an oblique set for and during  
5 the forward travel of the truck and giving them an edge presentation or set for and during the back travel of the same, essentially as and for the purposes set forth.

4. Giving to said paddles reverse obliquities for and during the forward travel of  
10 the truck, so as to throw the grain alternately to the right and to the left in the feed forward of the grain by the paddles.

5. The combination, with the reciprocating truck and its paddles, of a cross sliding  
15 frame made to gear by cranks or their equivalents, with the several paddles for simultaneously changing the latter from an oblique to a straight set and vice versa,  
20 substantially as specified.

6. The combination, with the cross sliding frame to the reciprocating truck, of one or more adjustable inclines and stops, for automatically reversing the position of the  
25 dles in their one direction.

7. Drawing the cross frame back to its original position, to give to the paddles a different set, by means of a clip lever acted on by a weight, weighted catch, and inclined projection connected with the reciprocating  
30 truck, or their equivalents, also afterward returning said lever to its former position, to be locked by the weighted catch, by an inclined plane on the truck acting against and over a swell on the lever, substantially  
35 as herein set forth.

8. Varying the range of motion of the reciprocating truck on or over the drying surface and relatively to the feed or delivery  
40 ends thereof, by means of a lengthening and shortening driving pitman made adjustable, substantially as specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

SYLVESTER MARSH.

Witnesses:

A. POLLAK,

EDM. F. BROWN.