

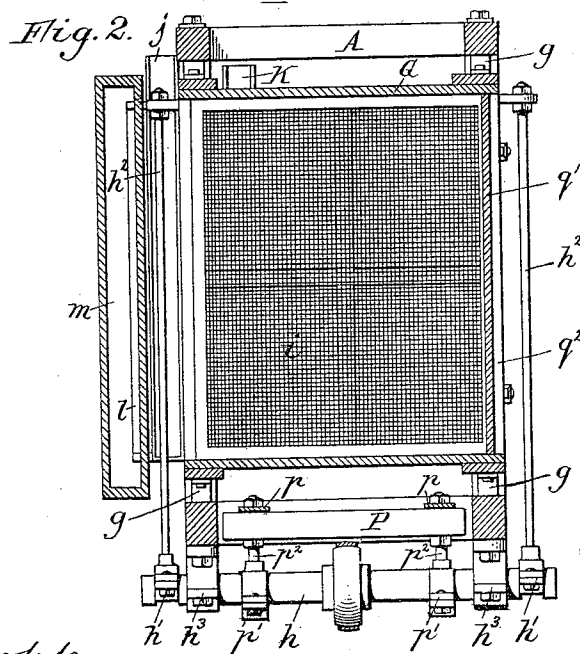
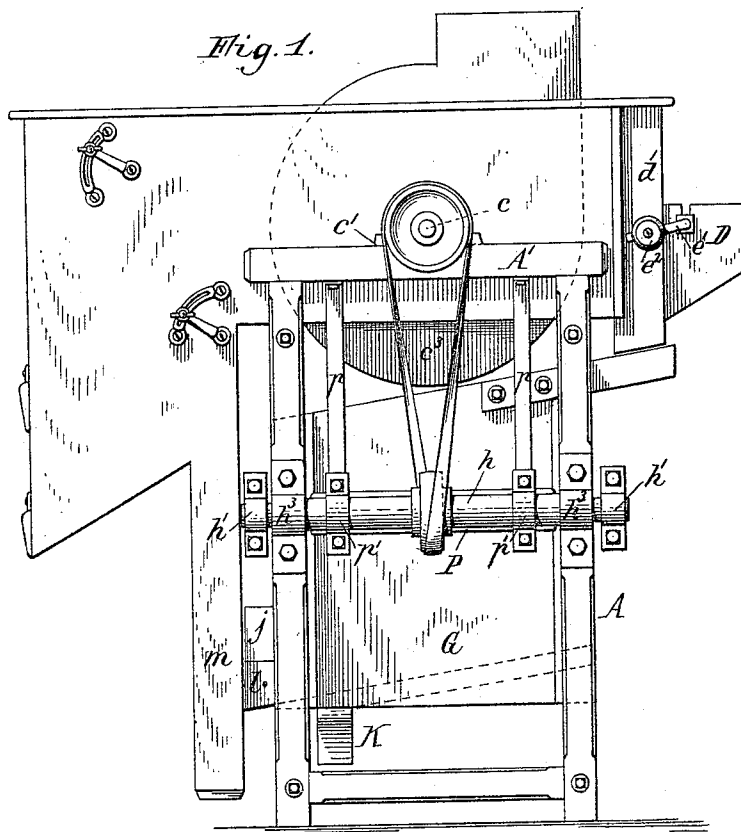
(No Model.)

2 Sheets—Sheet 1.

J. MCGILL & T. RYAN.
GRAIN SEPARATOR.

No. 460,691.

Patented Oct. 6, 1891.



Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES MCGILL AND THOMAS RYAN, OF LOCKPORT, NEW YORK, ASSIGNORS
TO THE RICHMOND MANUFACTURING COMPANY, OF SAME PLACE.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 460,691, dated October 6, 1891.

Application filed April 20, 1888. Serial No. 271,295. (No model.)

To all whom it may concern:

Be it known that we, JAMES MCGILL and THOMAS RYAN, both of Lockport, in the county of Niagara and State of New York, have invented new and useful Improvements in Grain-Separators, of which the following is a specification.

This invention relates to that class of grain-separators which are provided with a series of shaking-screens and with air-trunks in which the grain is freed from the light impurities. In large grain-separators of this kind the weight of the shaking-screens and the shoe or frame in which they are mounted is considerable; and the rapid vibratory motion of these parts produces trembling of the machine and its supports and corresponding wear. This difficulty has been overcome in a measure by arranging the screens in two series and mounting them in separate shoes, which vibrate in opposite directions; but this complicates the construction of the machine and does not effect a perfect balance, as it does not evenly divide the load, the lowest screen generally holding more grain than the upper screens.

The principal object of our invention is to balance the shaking shoe or frame in a simple and effective manner.

Our invention has the further object to prevent air from entering the suction-spouts with the grain; also, to prevent fire and smoke from entering the fan-case in the event of the bearings becoming overheated; also, to prevent the grain from escaping at the heads of the screens.

The invention consists of the improvements, which will be hereinafter fully set forth and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 represents a side elevation of a grain-separator provided with our improvements. Fig. 2 is a horizontal section thereof. Fig. 3 is a vertical longitudinal section of the same. Fig. 4 is a vertical cross-section of the upper portion of the machine.

Like letters of reference refer to like parts in the several figures.

A represents the stationary supporting-frame of the machine.

B is the preliminary separating wind-trunk, and B' is the subsequent separating wind-trunk, both mounted on the top of the frame.

c represents the horizontal fan-shaft, turning in bearings c', secured to the main frame. c² is the fan, mounted on the shaft c, and c³ is the casing inclosing the fan and provided in its sides with eyes or openings c⁴ c⁵, through which the air and fine dust are drawn into the fan-case from both wind-trunks in a well-known manner.

D represents the feed-box arranged at the front end of the machine and provided in its rear wall with a discharge-opening d, through which the grain passes into the ascending leg d' of the preliminary wind-trunk B.

E represents an automatic valve arranged within the feed-hopper D in front of the opening d and capable of swinging inwardly, or toward said opening. The automatic valve E depends from a horizontal shaft e, which is provided outside of the feed-box with a rearwardly-projecting arm e', carrying an adjustable weight e², which tends to swing the valve away from the opening d and toward the inclined bottom of the feed-hopper.

The automatic valve E floats upon the stream of grain, by which it is lifted and moved inwardly, and it compels the grain to flow in a thin stream of uniform thickness into the separating-leg d', but prevents the air from entering the leg through the opening d above the stream of grain, thereby increasing the suction in the leg. As the grain enters the ascending leg d' it encounters an upward air-current, which carries off the dust, chaff, and light impurities, the dust passing to the fan, while the chaff and other impurities are discharged into a pocket or chute f, arranged at the rear end of the wind-trunk B in the usual manner.

G represents the shaking-shoe arranged in the frame A below the wind-trunks B B' and supported in the frame by flexible bars g. The shoe G receives a shaking motion from a horizontal shaft h by means of eccentrics h' and connecting-rods h². The shaft h is mounted in suitable bearings h³, secured to the front side of the supporting-frame A.

i i' i² i³ represent the inclined separating

screens or sieves arranged in the shaking-shoe G one above the other. The upper screen *i* receives the grain from the separating-leg *d'*. The straw, sticks, and other large impurities are separated from the grain, small seeds, &c., by the upper screens *i i' i''*, and pass into a trough *j*. The sand, cockle, and small seeds pass through the lower screen *i''* into a trough K, and the separated grain escapes from the tail of the lower screen *i''* through a spout *l*.

m represents the ascending separating-leg of the subsequent wind-trunk B', and receiving the grain from the spout *l*, which projects into the leg *m* through an opening *m'*.

O represents an automatic floating valve similar to the valve E and located in the discharge-spout *l*. This valve permits the grain to enter the leg *m*, while excluding the air from the opening *m'*.

P represents a counterbalance or vibrating weight arranged between the shaft *h* and the adjacent end of the shoe and suspended from the top cross-piece A' of the frame A by flexible hangers *p*. The counterbalancing-weight P receives a vibrating motion from the shaft *h* by two eccentrics *p' p'*, mounted on said shaft, and two short connecting-rods *p² p²*. The eccentrics *h'* and *p' p'* are mounted upon the shaft *h* opposite each other, so that the shaking-shoe and the counterbalancing-weight are vibrated in opposite directions. By this means the vibrating weight counteracts the motion of the shaking-shoe, thereby avoiding trembling of the machine and of the floor of the mill, and preserving the rigidity of the frame of the machine.

The counter-balance has preferably double the throw of the shaking-shoe and half the aggregate weight of the shoe, the screens, and the average quantity of grain carried on the screens; but this proportion may be varied, if desired.

The shaking-shoe is provided in its side walls with grooves, in which the screens are arranged, and in its front side with transverse openings or slots *q*, through which the screens are introduced into the shoe. The openings *q* are partly closed by hinged doors or shutters *q'*, arranged on the inner side of the shoe and resting against the inner sides of the head-boards *q²* of the screens. The openings *q* above the head-boards are closed by the doors *q'*, which latter prevent the grain from

escaping through said openings, but permit ready access to the screens for cleaning, &c.

r represents inclined return-boards arranged below the screens *i i' i''*, whereby the grain passing through one screen is deflected toward the head of the screen next below.

s represents dish-shaped metallic plates or shields, which snugly surround the fan-shaft *c* on the inner sides of the wind-trunks B B', and which are secured to the latter. The openings *s'* in the wind-trunk, through which the fan-shaft passes, are made larger in diameter than the shaft, so as to leave air-spaces around the latter between the bearings *c'* and the wind-trunks, thereby preventing contact between the wooden trunks and the bearings. In the event of the bearings becoming overheated these shields prevent the fire and smoke from being drawn into the wind-trunks by the suction of the fan and setting the machine on fire. By making the shields concave or dish-shaped, as shown, a large space or chamber is formed around the fan-shaft, which permits a free circulation of air around the latter on the inner side of each bearing, and causes the fire and smoke to remain on the outer side of the machine, where it is likely to be detected.

We claim as our invention—

1. The combination, with the shaking-shoe G, provided in its end with a series of transverse openings *q*, and the screens which are introduced into the shoe through said openings, of hinged doors or shutters *q'*, closing said openings above said screens; substantially as set forth.

2. The combination, with the fan-shaft and its bearing, of a wind-trunk provided adjacent to said bearing with an opening through which the fan-shaft passes, made of larger diameter than the shaft, and a concave shield secured in said opening and snugly surrounding the fan-shaft, whereby an air-space is formed between the bearing and the wind-trunk and smoke and fire are prevented from being drawn into the wind-trunk, substantially as set forth.

Witness our hands this 17th day of April, 1888.

JAMES MCGILL.
THOMAS RYAN.

Witnesses:

WILLIAM RICHMOND,
JOHN MCLEAN.