

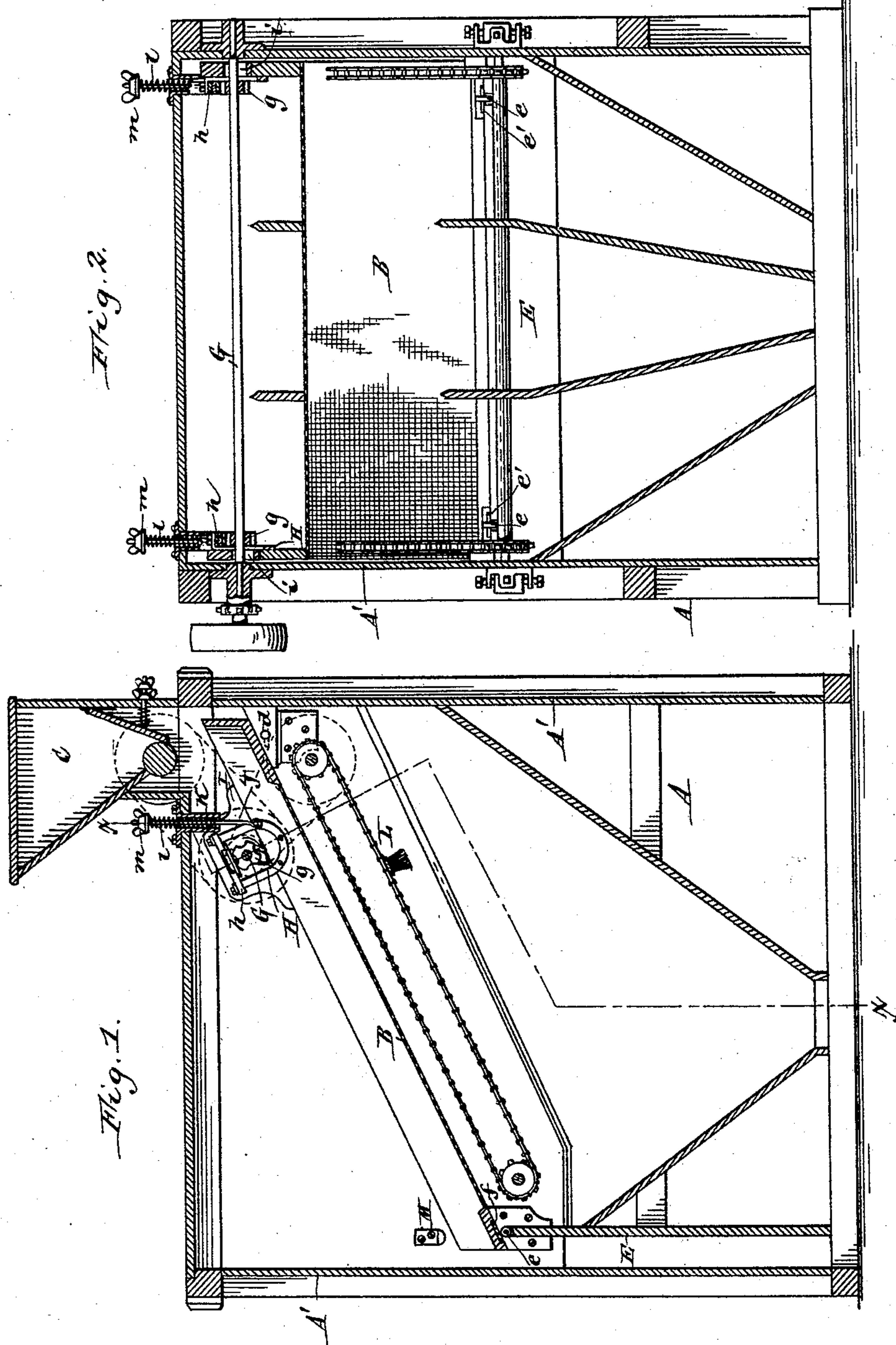
(No Model.)

2 Sheets—Sheet 1.

A. HEINE.  
SEPARATING MACHINE.

No. 455,592.

Patented July 7, 1891.



Witnesses:  
Emil Neuhart.  
Thos. L. Popp.

Aug. Heine Inventor.  
By Wilhelm O'Rourke  
Attorneys.

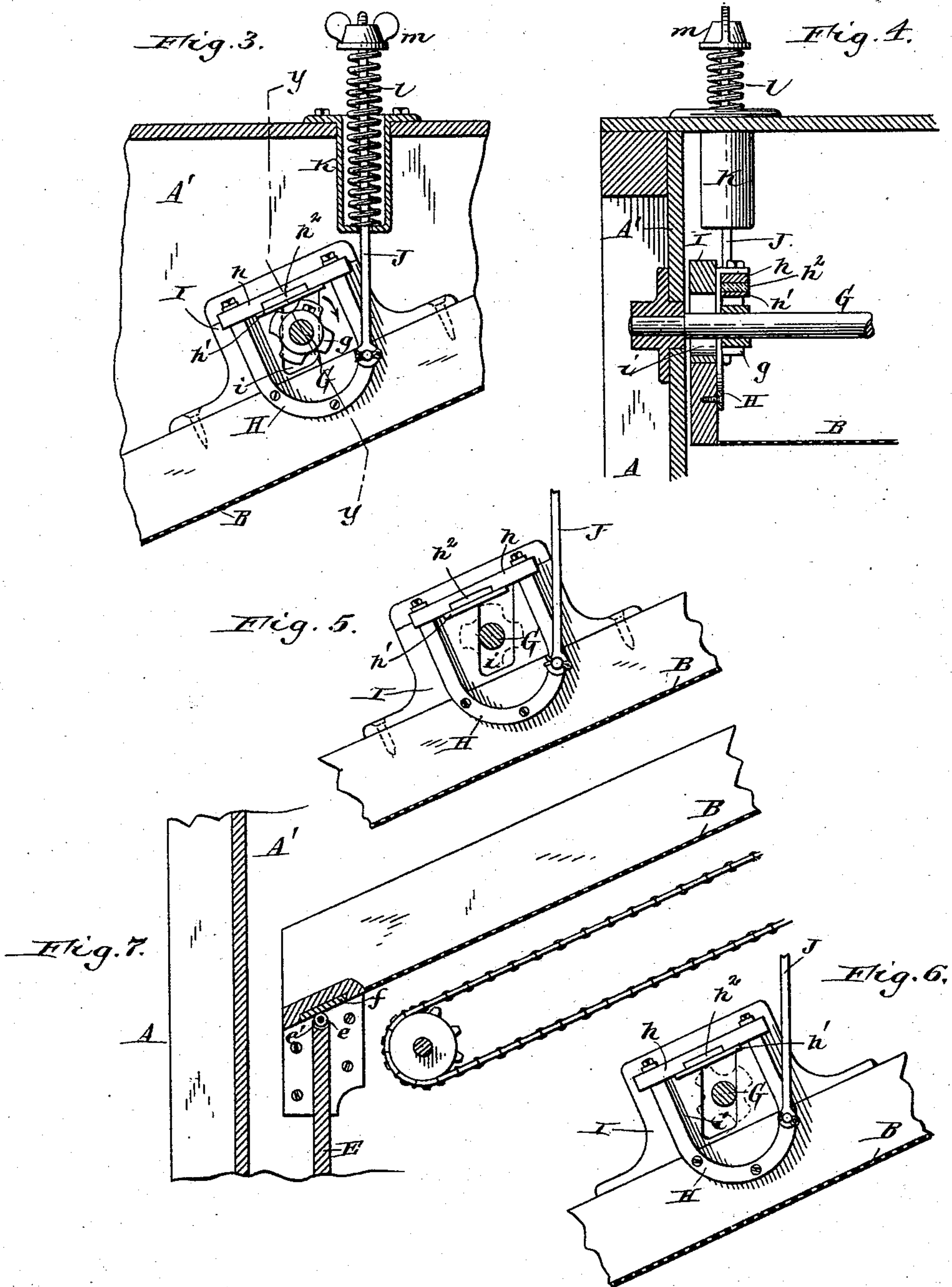
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# UNITED STATES PATENT OFFICE.

AUGUST HEINE, OF SILVER CREEK, NEW YORK.

## SEPARATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 455,592, dated July 7, 1891.

Application filed January 30, 1891. Serial No. 379,643. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST HEINE, a citizen of the United States, residing at Silver Creek, in the county of Chautauqua and State of New York, have invented new and useful Improvements in Separating-Machines, of which the following is a specification.

This invention relates to the class of separating-machines commonly known as "scalpers," which are employed in connection with roller-mills for separating the different breaks in the system of gradual reduction, and which contain an inclined screen resting on adjustable supports and actuated by rotating cams.

My invention relates more especially to improvements on a machine of this character for which Letters Patent of the United States No. 429,909 were granted June 10, 1890, to Newton B. Trask and myself.

The objects of the present invention are to simplify the construction of the machine, to impart by simple means a peculiar motion to the shaking screen, whereby a thorough and complete separation of the material is produced, and to reduce the friction and noise incident to the operation of the shaking screen in this class of machines.

In the accompanying drawings, consisting of two sheets, Figure 1 is a longitudinal section of my improved separating-machine. Fig. 2 is a cross-section thereof in line *x x*, Fig. 1. Fig. 3 is a fragmentary longitudinal section of the main frame of the separating-screen, on an enlarged scale, showing the means for suspending and cushioning the screen. Fig. 4 is a cross-section in line *y y*, Fig. 3. Figs. 5 and 6 are fragmentary sectional elevations of the shaking screen, showing different positions of the stops which strike against the cam-shaft. Fig. 7 is an enlarged longitudinal section of the tail end of the machine, showing the means for supporting the lower portion of the screen.

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

A represents the stationary frame of the machine; A', the inclosing case; B, the inclined separating-screen, and C the feed-hopper supported upon the frame above the head of the screen. The latter rests prefer-

ably at its head upon adjustable wedges *d*, by which the vertical throw of the head of the screen may be varied as desired. The tail or lower portion of the screen preferably rests upon transverse anti-frictional rollers *e*, journaled in plates or brackets *e'*, secured upon the inner wall E of the tail-spout of the casing and serves to reduce the wear and lessen the noise. The screen is preferably provided with contact-pieces *f*, of leather or similar material, which rest upon the rollers *e*, and are seated in the lower cross-piece of the screen above the rollers, as shown in Fig. 7. The screen rests loosely upon its supports and is free to move vertically as well as lengthwise on the same.

G represents the transverse cam-shaft whereby the screen is agitated. This shaft is arranged above the separating-screen near the head thereof, and is mounted in bearings secured to the stationary frame of the machine. *g g* are the cams secured to said shaft near the sides of the shaking screen and having alternate salient and receding portions.

H H are U-shaped brackets or open frames secured with their lower portions to the longitudinal side pieces of the screen. The upper portions of these frames project above the screen and are connected by longitudinal top bars *h*, against the under side of which the cams *g* operate. These cams are so arranged that when their receding portions are in contact with the top bars *h* of the brackets the screen rests upon its head-supports, while when the salient portions of the cams are in contact with said bars the upper portion of the screen is lifted above these supports. The screen is alternately elevated from and allowed to drop upon its head-supports by the rotation of the cams, giving the screen a jar at every downward movement. The rotating cams, by their frictional contact with the top bars of the brackets H, also impart a lengthwise movement to the screen in the direction in which they turn, the screen being moved upward as the projecting portions of the cams come in contact with the cross-bars of the brackets, and being allowed to again descend by gravity in the intervals during which the receding portions of the cams are in contact with said cross-bars. The screen thus receives



a compound rising and falling and forward and backward motion, whereby the material on the screen is tossed toward the head of the screen, and its downward flow over the screen is retarded. The top bars of the U-shaped brackets are preferably provided with a contact-facing  $h'$  of rawhide or other tough material, and this facing is backed by a cushion  $h^2$  of rubber, seated in a recess or socket in the bracket. The backing-piece  $h^2$  cushions the rawhide facing under the impact of the cam, thereby reducing the wear upon the cam and facing and deadening the noise.

I represent stop-blocks secured to the upper edges of the side pieces of the screen and provided each with an upright slot  $i$ , through which the transverse cam-shaft passes. The upright walls or sides of these slots form stops on opposite sides of the cam-shaft, which limit the longitudinal movement of the screen. The slots are made somewhat wider than the cam-shaft to permit of the necessary play of the screen; but they are narrower than the longitudinal range of movement of the screen, so that the sides of the slot alternately strike opposite sides of the shaft, as represented in Figs. 5 and 6, thereby giving the screen two sharp and sudden jars during every vibration, whereby the material is thoroughly agitated.

The upper side of the slot in each block while acting as stops for jarring the screen also prevents the same from sliding against the rear wall of the casing. These slotted blocks simplify the construction of the machine by dispensing with the flexible arms heretofore employed in machines of this class for preventing longitudinal displacement of the screen, and at the same time allow of a lengthwise vibration of the screen, which is not permitted by such flexible arms. By jarring the screen at every stroke, in addition to giving it a tossing or compound vertical and longitudinal motion, the material is thoroughly agitated as well as retarded in its flow over the screen, thereby effecting a very thorough separation.

J represents suspension-rods, which are arranged near the head of the screen at opposite sides thereof and carry a portion of the weight of the screen, thereby causing the same to operate with less noise and friction and reducing the wear upon the cams and brackets. Each of these suspension-rods is pivotally attached at its lower end to the adjacent bracket or to the side of the screen and extends upwardly through a depending socket K, secured in an opening in the top of the casing.

$l$  is a spiral spring or cushion arranged within the socket K around the suspension-rod and interposed between the bottom of the socket and a thumb-nut  $m$ , applied to the upper threaded portion of the suspension-rod. Upon screwing the thumb-nuts  $m$  up or down on the suspension-rods the springs  $l$  are strained to a greater or less degree, and the

suspension-rods are caused to carry more or less of the weight of the screen. The springs relieve the cams and brackets from a part of the weight of the screen and also cushion the downward movement of the latter, and thereby ease the jar received by the screen on its downward stroke.

By adjusting the springs  $l$  the screen may be raised or lowered in a measure to move the contact-faces or top bars of the brackets toward or from the faces of the cams, thereby varying the amplitude of the toss or vertical movement imparted to the screen and adapting the machine to the treatment of different materials.

The sockets K and the openings in the bottom of the same through which the suspension-rods pass are made large enough to permit of the requisite slight rocking movement of the rods in the sockets.

The brackets and cams are preferably arranged near the head of the screen, as shown, so that the vertical throw of the screen is greatest at the head and decreases gradually toward the tail of the screen, where there is practically no vertical vibration, but only a reciprocating or lengthwise and rocking motion on the supporting-roller. This movement of the screen causes the thick layer of material on the upper portion of the screen to be violently shaken and to bound toward the tail of the screen, while as it arrives near the tail, where the layer of material is comparatively thin, it receives only a short shaking motion, thereby effecting a very thorough and satisfactory separation.

The usual traveling brush L may be employed for cleaning the bolting-cloth of the machine.

Stops M may be secured to the inner side of the casing above the tail portion of the screen to prevent the latter from being accidentally raised to an abnormal height.

I claim as my invention—

1. The combination, with the stationary frame, of an inclined separating-screen resting upon suitable supports and capable of lengthwise movement thereon, a transverse shaft having a cam, whereby a compound rising-and-falling and upward-and-backward movement is imparted to the screen, and stops arranged on the screen on the head and tail sides of said cam-shaft and striking against the latter during the forward-and-backward movement of the screen, substantially as set forth.

2. The combination, with the stationary frame, of an inclined separating-screen provided with stops having upright slots, open frames or brackets secured to the screen, a transverse cam-shaft journaled on the frame and passing through said slotted stops, and cams mounted on said shaft and operating against the open frames or brackets, the slotted stops being arranged to strike against the shaft during the forward-and-backward movement of the screen, substantially as set forth.



3. The combination, with the stationary frame, the inclined screen, and the actuating-shaft provided with cams, of stops which limit the longitudinal movement of the screen, suspension-rods, which are attached to the screen, and springs or cushions by which the suspension-rods are supported on the stationary frame, substantially as set forth.

4. The combination, with the stationary frame and the inclined screen, a tail-support, on which the screen rocks and moves lengthwise, an actuating-shaft provided with cams arranged over the head portion of the screen, open frames or brackets secured to the head portion of the screen and resting on the cams, and cushioned suspension-rods connected with the head portion of the screen, substantially as set forth.

5. The combination, with the stationary frame and the cam-shaft, of the separating-screen provided on opposite sides of the cam-shaft with stops, which strike against the shaft during the forward-and-backward movement of the screen, and cushioned suspension-rods connected with the screen and carrying part of its weight while permitting it to move lengthwise, substantially as set forth.

6. The combination, with the stationary frame and the cam-shaft, of the separating-screen provided on opposite sides of the cam-shaft with stops, which strike against the

shaft, a socket secured to the stationary frame, a suspension-rod connected with the screen, and a cushion or spring applied to said rod and seated in said socket, substantially as set forth.

7. The combination, with the stationary frame and the cam-shaft, of the separating-screen provided on both sides of the cam-shaft with stops, which engage against the cam-shaft during the forward-and-backward movement of the screen, and a supporting-roller journaled in the stationary frame underneath the tail portion of the screen, substantially as set forth.

8. The combination, with the stationary frame, of an inclined separating-screen, a transverse actuating-shaft provided with cams, open frames or brackets secured to the screen and extending over the cams, flexible contact-pieces secured to the top bars of the open frames or brackets, and yielding cushions interposed between said top bars and the flexible contact-pieces, substantially as set forth.

Witness my hand this 28th day of January, 1891.

AUGUST HEINE.

Witnesses:

JNO. J. BONNER,  
F. C. GEYER.