No. 698,258. Patented Apr. 22, 1902.

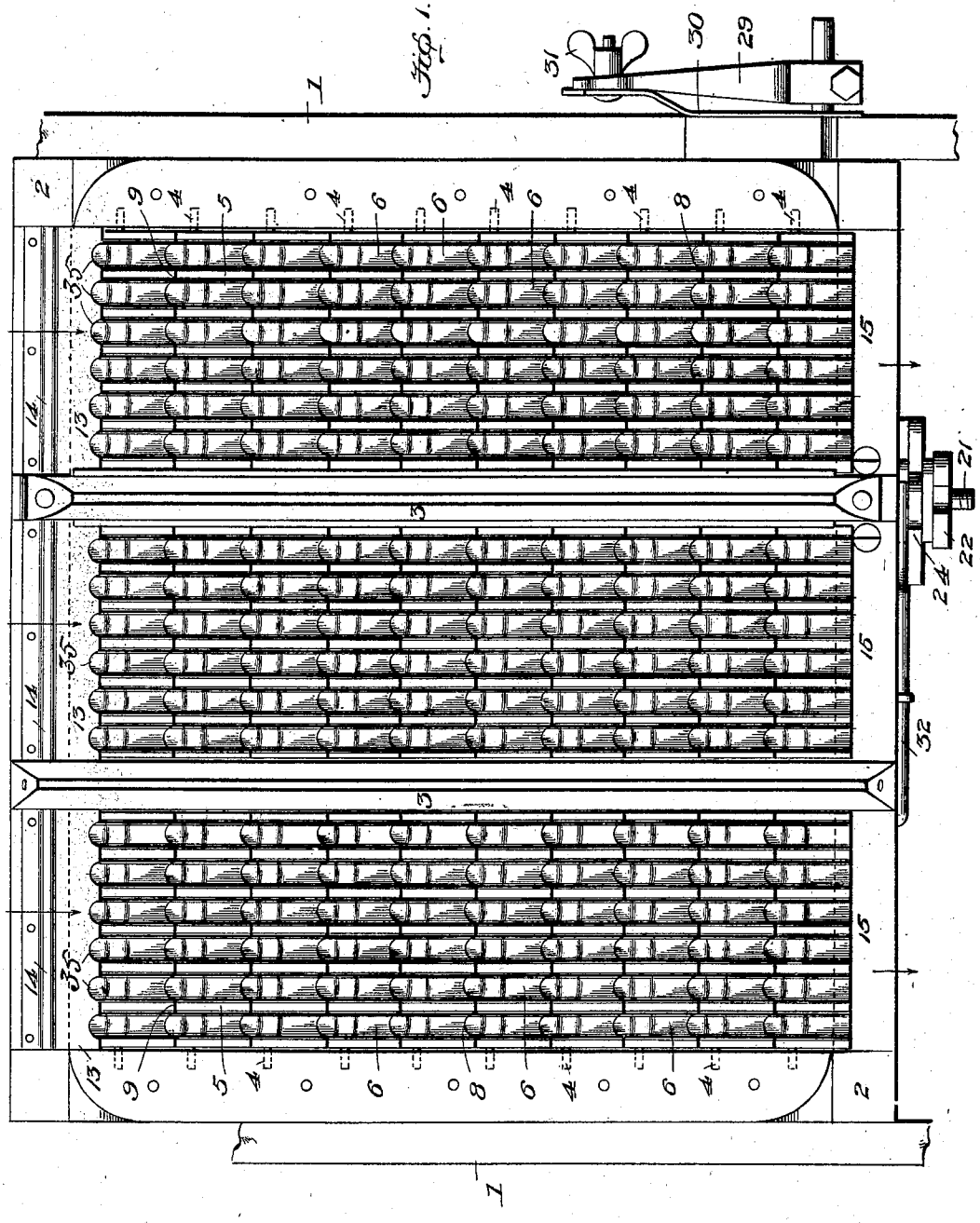
C. CLOSZ.

GRAIN CLEANING SCREEN.

(Application filed May 11, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



Witnesses

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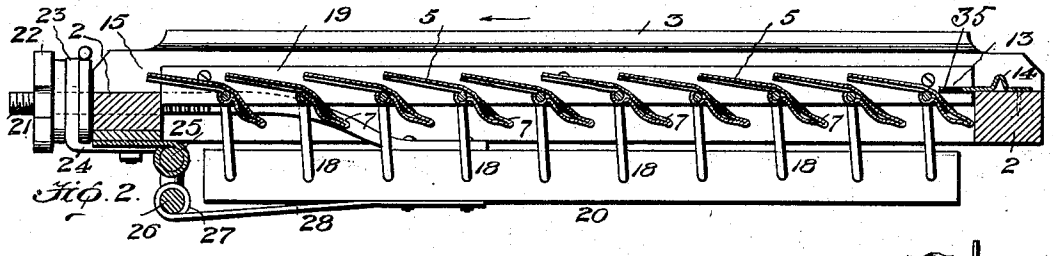


Fig. 2.

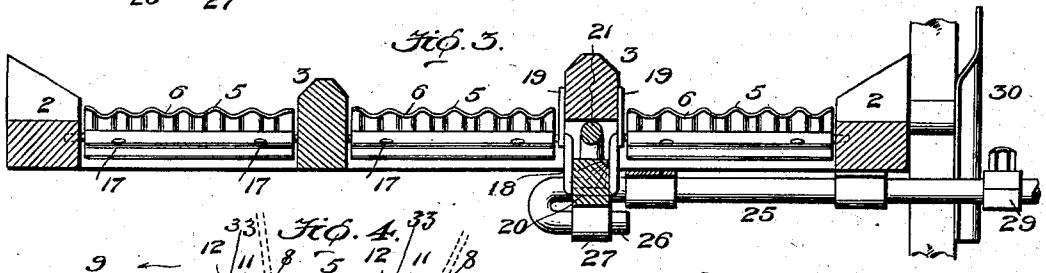


Fig. 3.

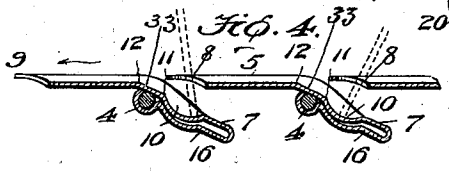


Fig. 4.

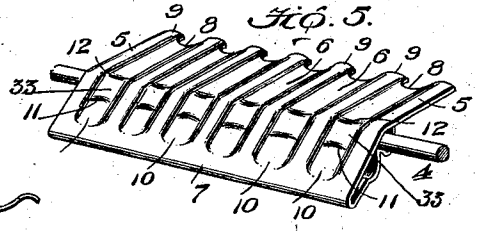


Fig. 5.

Fig. 6.

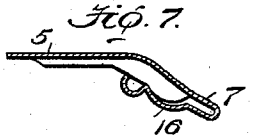


Fig. 7.

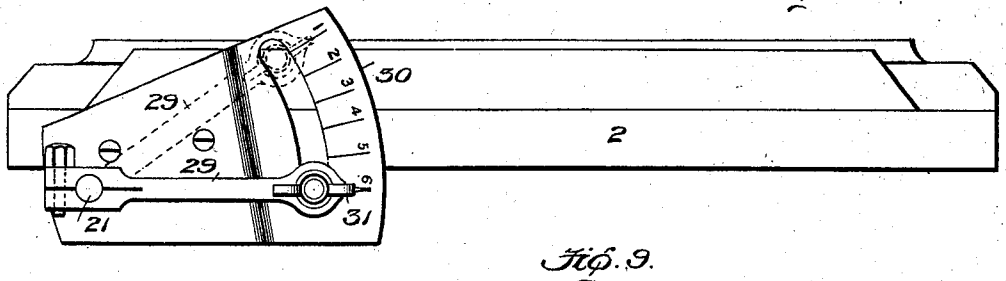
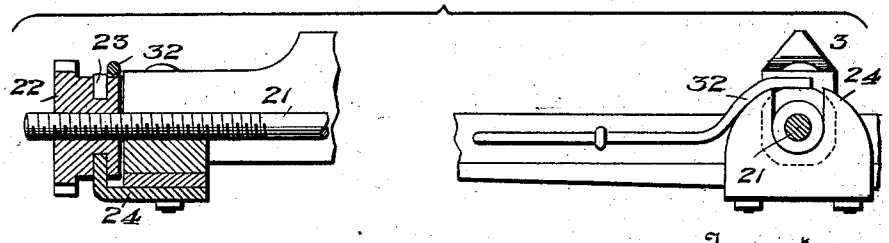


Fig. 8.

Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES CLOSZ, OF WEBSTER CITY, IOWA.

GRAIN-CLEANING SCREEN.

SPECIFICATION forming part of Letters Patent No. 698,258, dated April 22, 1902.

Application filed May 11, 1901. Serial No. 59,819. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CLOSZ, a citizen of the United States, residing at Webster City, in the county of Hamilton and State of Iowa, have invented certain new and useful Improvements in Grain-Cleaning Screens, of which the following is a specification.

The screen to which my improvement is directed is of the character in which the separating-surface is formed of parallel slats pivotally arranged to form openings between them transverse to the path of the movement of the grain and straw and are adjustable to meet the requirements of different kinds and conditions of grain and to control the volume of air-currents, so that a single shaking screen may be used in the same threshing-machine for different kinds of grain. The precise improvement in such a screen will be set out in the claims appended hereto in connection with the accompanying drawings, in which—

Figure 1 shows my improved grain-cleaning screen, which, it will be understood, is of a construction adapted to receive the screenings from the upper or chaffer separator of a threshing-machine. Fig. 2 is a vertical longitudinal section of the same, the slats being shown in their partial open relation for coarse grains, such as oats or barley. Fig. 3 shows a transverse section of the same wherein is seen the device for indicating the size of the openings in the adjustment of slats, and thereby the relative positions of the slats. Fig. 4 shows, enlarged, in transverse section three of the slats as set in their minimum closed relation for cleaning fine seeds, the line of section being through the surface-channels of the slats. Fig. 5 shows one of the slats in perspective. Fig. 6 is an edge view of one of the slats. Fig. 7 shows one of the slats in cross-section, the line of section being through the convex rib. Fig. 8 is a side view of the screen-frame, showing the means for indicating the adjusting the slats. Fig. 9 shows detail views showing the adjusting device for the slats.

The screen is designed for separating the chaff and coarse matter which usually come from the first separation, and is especially adapted for preventing straw, weeds, or other coarse matter from going through the screen when the slats are set for cleaning fine seeds.

The screen is formed of separate sections arranged in a frame of rectangular form mounted within the shoe, of which the numeral 1 may represent the side walls, the shoe being mounted in the well-known manner for an endwise reciprocating movement. The frame is of suitably-connected bars 2, and the screens are divided into surface-sections by bars 3, which are parallel to the direction of the flow over the screens, stand above the screening-surface, and serve as the means of pivotally mounting with the frame. These separate slats are of sheet metal arranged transversely in parallel relation, so that the forward edge of one overhangs the rear edge of the next adjacent slat and form openings between and at the lapping parts. Certain peculiarities of construction of these slats are seen in Figs. 4, 5, and 7 and constitute a feature of my improvement. These slats have a width about two inches, more or less, and are fixed to a rod 4, which is pivotally mounted in the frame, so that the slats of each transverse line of each screen-section are fixed on one and the same rod, and as the slats are fixed mediately of their width to these rods that part of each slat which stands forward of the rod in the line of flow overhangs that part of the next adjacent slat which stands back of the rod, as in Figs. 2 and 4, and it is this lapping arrangement of the slats whereby their adjustment is caused to form and to control the mesh-openings for the passage of the grain between the slats. Each slat is formed with transverse parallel ridges 5 and concave channels 6, and the channels of all the slats are in alinement, so that the channels form conduits which receive and convey the grain to the dropping-off edge of each slat from the receiving to the discharging end of the screen. These conduits 6 are rendered practically continuous over the slats by the half-circle formation of their forward or overhanging edges, and such continuity serves also to give these channels 6 the functions of guides for conveying stems of weeds and straw-joints in a lengthwise position over the dropping-off edges of one slat into the channel of the next adjacent slat,

and thereby prevent such matter from passing through between the slats with the grain. The underhanging part of each slat terminates in a flat tail-strip 7, at which the convex ridges 5 also terminate. At the overhanging edge each slat terminates in half-circles 8, corresponding with the channels 6, and the ridges 5 terminate in square pointed teeth 9, which are in alinement with the ridges 5 of each slat and with the half-circle edge 8 form a transverse line of openings at the overhanging edge of each slat. The relation of the overhanging part of the slat to the underhanging part is such that when the slats are set to form the minimum area of openings for separating and cleaning certain kinds of small seeds the overhanging parts will stand about horizontal, while the underhanging parts will stand at a considerable inclination downward toward the receiving end of the screen, as in Fig. 4. The concave channel 6 terminates in the underhanging inclined part of the slat in a depression 10 of circular form and in position about vertically under the half-circle edge 8 of the overhanging part, and this depression terminates at the flat surface tail-strip 7. This relation of the half-circle edges 8 and the cavities 10 is important in providing free openings for the dropping of the grain from the channels and for turning the wind-blast upward in a way to facilitate the cleaning on the screen. Such relation is equally important in forming the means whereby straws or weeds falling through the half-circular edge openings will lodge endwise in the cavities 10, as in Fig. 4, and by such endwise engagement with the underhanging and with the overhanging parts of the slats and the shaking of the screen will be turned forward into the channel and carried off. This function of the half-circle edge 8, and the under cavity 10 is particularly effective when the teeth of the overhanging part are set to close upon the convex ridges for cleaning fine seeds. Another element contributes to the effectiveness of this function, and that is, referring to Fig. 4, the provision of a flat surface in the channel starting from the inner upper edge of the cavity 10 at 11, which is about vertically below the overhanging points of the slat and extending slightly beyond these points on a slightly upward incline terminates at 12 in the channel, so that short pieces of weeds and straw will be freely moved over each slat. The ends of this flat part form ridges 11 12 across the channel, so that when the slats are opened for coarse grain, such as oats or barley, the ridge short cross 12 will form a sort of dividing-line to check the too rapid flow of the grain, while affording a bearing-surface for conveying stems through the channels. The edge of one slat formed with the half-circles overhanging the corresponding under circular cavities and the flat tail-strip 7, into which the cavities merge, of the next adjacent slat coöperate to prevent straw and weeds from going through the openings formed between the slats when nearly or quite closed. I find that if straw and weed-stems are checked from going through the screen as they fall from the chaffer-separator they will lie flat on the surface and will follow the channels or be carried crosswise over the openings by the fingered ridges from one slat to the other. Referring to Figs. 4 and 5, it is important to note that the convex slat-ridges 5 extend with a uniform curve from the flat tail edge 7 of the slat to the fingered edge and that the concave channels have a width greater than the width of the ridges and form free conduits for the grain over the surface of the screen and off at the half-circle edges 8, and it is this construction which is especially adapted for cleaning different sizes of seeds and grain. While the provision of the wide channels 6 promotes the separating effect of the wind-blast and the free movement and dropping of the grain, the construction and relation of the overhanging slat-fingered edge 9 with the under cavities 6 and 10 are such that in adjusting the slats to form the smallest mesh the half-circle edge 6 and 9 will still form the mesh-openings.

At its receiving end, which is the top of Fig. 1, as shown by the arrows, and the right end of Fig. 2, the screen is provided with a receiving-plate 13, fixed to the frame, formed with half-circles 35 at its forward edge 35 and an elevated corrugation 14, parallel with its toothed edge, extending between the frame-bars. The edge of half-circles 35 of this plate is to conform to the channels 6 of the screen and gives the grain a free delivery over its flat surface into the channels of the first slat, while the corrugation or ridge 14 serves to prevent the grain from working backward over the frame, more particularly when the latter is used in a level position in the machine.

The slat 15 at the delivery end of the screen terminates in an unfingered or unbroken edge and without the half-circles of the slat edges, and this construction I find prevents any weeds or straw from all tendency to work back under this slat and fall under with the cleaned grain.

A convenient way of mounting the slats is by doubling or lapping the underhanging slat part 16 so that its under edge will be clasped over the rod as a means of fixing the slat to the rod, holes 17 being provided for soldering the slats to the rod. For raising and lowering the overhanging parts of the slats to regulate simultaneously the openings between all the slats the rod on which each transverse line of slats is mounted has a crank 18, Figs. 2 and 3, depending from hanger-plates 19, fixed on each side of one of the intermediate frame-bars. A longitudinal bar 20 connects all these cranks and is suspended by them, so that by moving this bar toward the delivery end of the screen the curved edges of the slats will be raised. The reverse movement of

this bar will lower the slats. For effecting these adjustments of the slats a rod 21, fastened to the upper side of the bar 20, extends in alinement therefrom through an opening in and terminates in a screw-threaded end outside of the bar at the delivery end of the screen-frame. A thumb-nut 22, engaging this screw-rod, also engages, by means of a circumferential groove 23, an angle-plate bracket 24, fastened to the under side of the frame-bar, so as to fit within the nut-groove. By turning the nut to the right the suspended bar will be drawn outward and with it the cranks of all the slats, which will cause all the slats of the screen to be simultaneously rocked on their pivots, thus lifting the toothed edges of all the slats to increase the area of the openings between them. By turning the nut to the left the toothed edges of all the slats will be closed down, or nearly so, upon the ridges 5 of the next succeeding slat, forming thereby a line of chutes 6 between teeth and between the slats, down which the grain falls over the half-circle edges as the mass is moved forward by the reciprocating movement of the screen, while by the same movement of the screen the grain collecting in the channels 6 will also pass back toward the toothed edges and down the chutes. When set, a spring engages a flattened part of the nut and holds it from turning, the spring being shown at 32 in Fig. 9.

When a threshing-machine is in operation, there is so much dust and chaff over the screen that it is difficult and often impossible to see the screen-openings and to tell their sizes or the relative positions of the slats in forming the openings. To avoid this difficulty, I provide an indicator and use the suspension-bar as the means of actuating the indicator, as I will now state.

On the under side of and at that end of the frame at which the adjusting-rod is arranged is secured a rod 25, with its inner end formed into a return-bend 26 for engagement with a loop 27, which may be formed of a spring-plate 28, secured to the end of the suspended bar, preferably at its under side. The outer end of this rod 25 extends through the side wall of the shaking-shoe and has an arm 29, which stands against a scale-plate 30, fixed to the side of the shoe, so that the arm forms a pointer for the scale. Any adjustment of the suspended bar to open or to close the slats will, by means of the return end of the rod 25, cause said rod to rock, and thereby move the pointer-arm to indicate on the scale the size of the openings between the slats, and in this way the adjustment may be made to suit the work to be done. A thumb-nut 31 may be provided, movable in a slot in the scale-plate, for clamping the pointer-arm thereto when the slats are set. The return-bend of the scale-indicating rod allows the quick and convenient removal of the screen from the shoe and its replacement. For this purpose the arm-pointer can be loosened on the rod and the latter driven inward through its bearings a sufficient distance to disengage the return-bend 6 from the suspended bar, leaving the latter free to be removed with the screen.

It will be noted that in Fig. 8 the indicator-arm is set automatically by the act of adjusting the slats and that the indicator is at its extreme position at the scale-numeral 6, which indicates that the slats are set to give the widest openings between them, while the other extreme position of the indicator shown in dotted lines at the scale-numeral 1 indicates the closed positions of the slats, so that the intermediate scale-numerals will give the setting of the slats between the two extremes.

In Fig. 3 I have shown the return-bend of the indicating-rod connected by a plate-spring to the suspended bar; but obviously such connection may be made by other means, which will, by the adjustment of the bar, cause said rod to rock, and thereby move its connected pointer-arm.

Obviously any number of screen-sections may be used.

In Fig. 1 is seen the scalloped edge of the receiving-plate 13 and in Fig. 2 its overhanging relation to the slat, so that the teeth of the plate overhang and lie upon the ridges 5 of the slat, and the half-circle scallops of said plate 13 overhang the channels of the slat, while the unfingered edge 15 of the slat at the delivering end of the screen overhangs and lies upon the frame-bar.

I have stated that the slats are fixed to their pivot-mounting rods and have shown as a convenient and effective means for such fastening the doubling of the lower ends of the slats on their under sides and securing the doubled parts by bending the under edge of the latter over and around the rod and soldering such bent edge to the rod at one or more holes 17 in the bent edge, and I now wish to state that to allow the slat edge to be so turned up close and snugly against the rod and the under part of the slat it is necessary to give the doubled part of the latter a bulge or swell between its doubled edge and its bent edge on the fixed rod 4, as seen more clearly in Fig. 7. The function of this swell or bulge is to provide a fulness in the under lap, and this fullness is taken up in the operation of bending the edge over the rod, with the lap close against the underhanging part of the slat. But for this fullness in the lap it would constantly tend to spring back from the rod if the lap was straight; but with the capacity of the lap to take up the fullness in bending its edge over the rod the solder applied to the bend on the rod 4 will prevent the slat from becoming loose on the rod.

Looking at Fig. 3, it will be noted that the hanger-plates 19 in their function of separate journals on each side of the frame-bar serve as abutments for the ends of the slats, while the cranks form abutments between and against the hanger-plates. This construc-

tion gives the slat-journals a bearing which is not affected or shaken loose by the action of a side-shake screen.

I claim—

1. In a grain-separating screen and in combination with a frame, and a screening-surface of slats pivotally mounted, each slat having transverse ridges and channels and terminating in a scalloped overhanging edge, each channel having a depression 10 in the underhanging part of the slat and a flat transverse surface 33 interrupting said channel and joining the upper edge of said depression, for the purpose stated.

2. In a grain-separating screen and in combination with a frame, a screening-surface composed of a plurality of pivotally-mounted adjustable slats in parallel transverse lapping relation in separate sections, each slat having ridges and between them channels in the line of the flow over the screen and terminating in a scalloped overhanging edge, the channels having a width greater than that of the ridges and terminating in depressions or cavities in its underhanging part and transverse ridges forming a flat surface in each channel between the scalloped edge and the cavities for the purpose stated.

3. In a grain-separating screen and in combination with a frame, a screening-surface composed of a plurality of pivotally-mounted adjustable slats in parallel transverse lapping relation in separate sections, each slat overhanging the next adjacent slat and formed with transverse ridges and between them channels which terminate in half-circles at the overhanging edge and in alinement with the flow over the screen, the channels forming chutes beneath the half-circles at the edge of each slat, whereby the grain is free to have a movement toward and over the forward and toward and over the inward edges of each slat for the purpose stated.

4. In a grain-separating screen and in combination with a frame, a screening-surface composed of a plurality of pivotally-mounted adjustable slats in parallel transverse relation in separate sections, each slat overhanging the next adjacent slat and formed with ridges and channels in the line of the flow over the screen, terminating in a scalloped edge, a fixed plate for each screen-section along its receiving end having a fingered edge corresponding to the ridges and channels of the slats and having a ridge or raised corrugation back of and parallel with its fingered edge, for the purpose stated.

5. In a grain-separating screen and in combination with a frame, and a screening-surface, the fingered plate whereof at the receiving end frame-bar having a convex corrugation mediately of and rising from its width, said bar being unobstructed at both sides of said corrugation for the purpose stated.

6. In a grain-separating screen and in combination with a frame, a plurality of pivotally-mounted adjustable slats in parallel transverse relation in separate sections, each slat overhanging the next adjacent slat and formed with transverse ridges and channels terminating in a scalloped or fingered edge and in alinement from the receiving to the delivering end of the screen, a fixed plate for each screen-section along its receiving end having a fingered edge corresponding to the ridges and channels of the slats and a ridge or raised corrugation back of and parallel with its fingered edge, and the slat at the delivering end of the screen overhanging the frame-bar and terminating in an unbroken or straight edge.

7. In a grain-separating screen and in combination with a frame, a plurality of pivotally-mounted adjustable slats in parallel relation in separate sections, each slat overhanging the next adjacent slat, cranks rigidly connecting the pivot-mounting of each slat, a bar freely suspended by said cranks, screw-rod horizontally connecting one end of the suspended bar with the frame, a nut on said screw-rod for adjusting the suspended bar for adjusting the relative relation of the overhanging parts of the slats to each other and means connecting the suspended bar and the frame whereby the adjustment of said bar is automatically caused to indicate by said means the relations of the slats to each other and thereby the size of the openings between their overhanging edges.

8. In a grain-separating screen and in combination with a frame, a plurality of pivotally-mounted adjustable slats in parallel relation in separate sections, each slat overhanging the next adjacent slat, cranks rigidly connecting the pivot-mounting of each slat, a bar freely suspended by said cranks, means for adjusting said bar to adjust the relative relation of the overhanging parts of the slats to each other, a rock-rod mounted on the frame having a return-bend engaging the end of the suspended bar, a scale-plate external of the frame and a pointer-arm on the rock-rod arranged to indicate by the rocking of the rod and said scale, the relation which the adjustment of the suspended bar will automatically cause to be given to the slats whereby to show the size of the openings between the overhanging edges of the slats.

9. In a grain-separating screen and in combination with a frame, a screening-surface composed of a plurality of pivotally-mounted adjustable slats, formed with transverse ridges and channels terminating in a scalloped edge, the slat at the delivering end of the screen overhanging the frame-bar and terminating in an unbroken or straight edge, a fixed plate on the frame at the receiving end of the screen having a fingered edge corresponding to the scalloped edge of the slats.

10. A screening-surface composed of a plurality of pivotally-mounted adjustable slats formed with transverse ridges and channels terminating in a scalloped edge, the slat at

the delivering end of the screen overhanging the frame-bar and terminating in an unbroken or straight edge, a plate fixed on the bar at the receiving end of the screen having a fingered edge corresponding to the scalloped edges overhanging said frame-bar and having a ridge or raised corrugation back of a parallel with its fingered edge.

11. In a grain-separating screen and in combination with the screen-frame and metal slats arranged therein in separate sections, a pivot-forming rod for each slat, each of said slats having its edge doubled under in a lap having its edge bent over the said rod and soldered thereto, and means for adjusting said slats.

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

CHARLES CLOSZ.

Witnesses:
W. J. BIERNATZKI,
WM. M. STUART.