Dec. 31, 1946. D. E. SARGENT ET AL 2,413,382

SHEET METAL SIEVE CONSTRUCTION FOR HARVESTERS

Filed Nov. 25, 1940 2 Sheets-Sheet 1

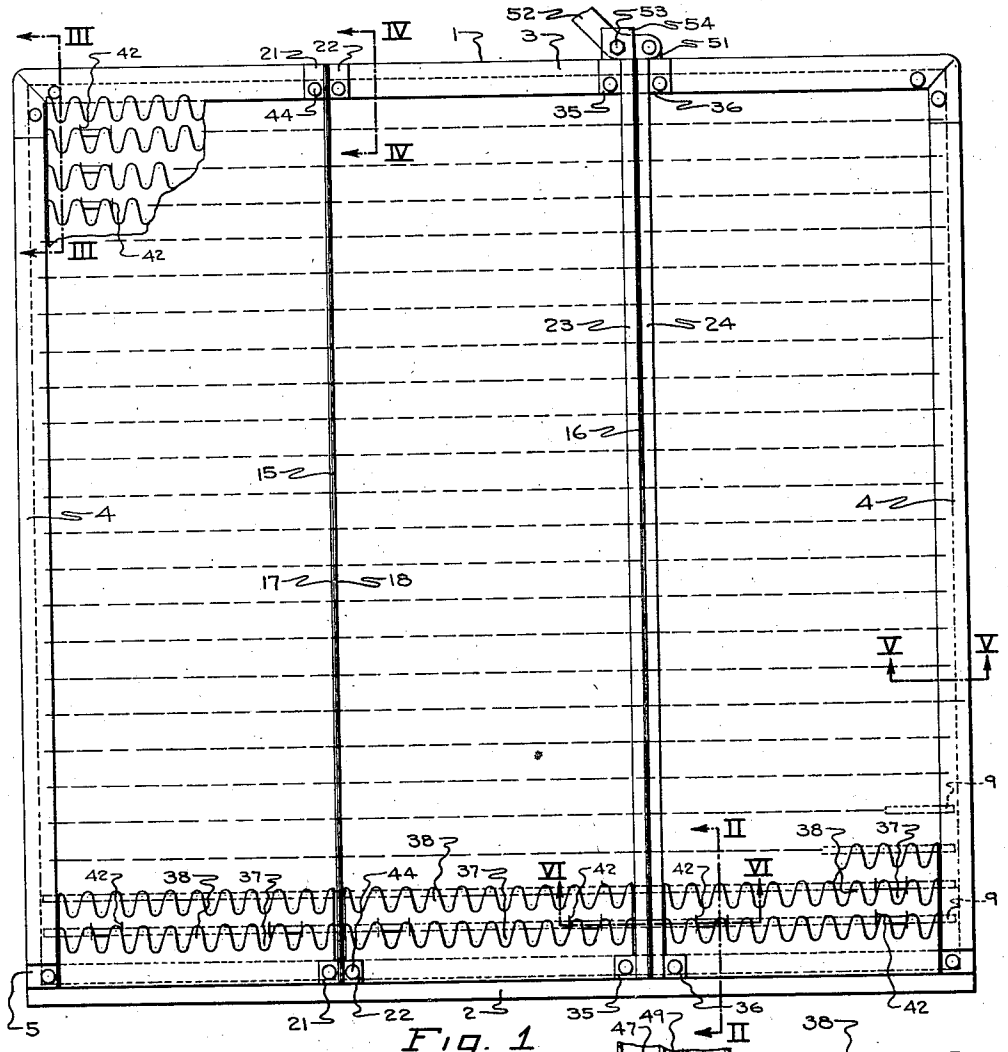


Fig. 1

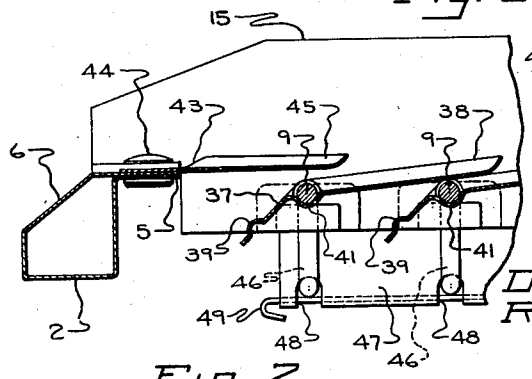


Fig. 2

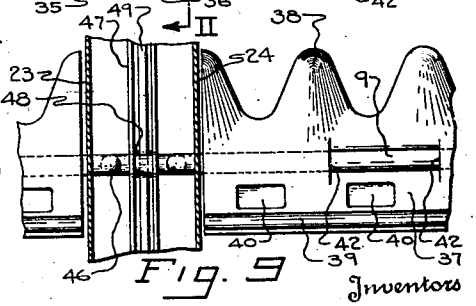


Fig. 9

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SHEET METAL SIEVE CONSTRUCTION FOR HARVESTERS

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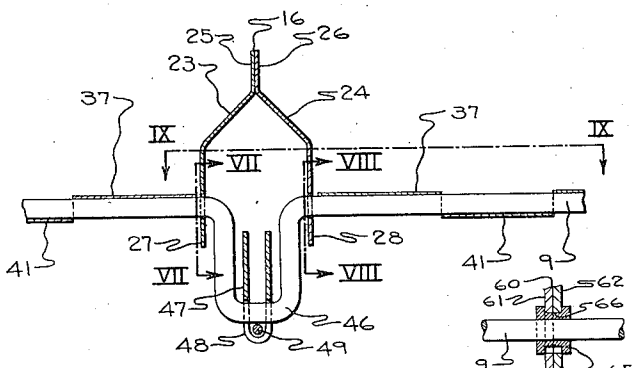


Fig. 6

Fig. 12

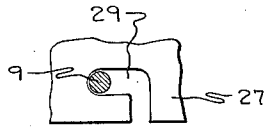


Fig. 7

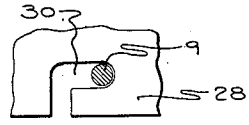


Fig. 8

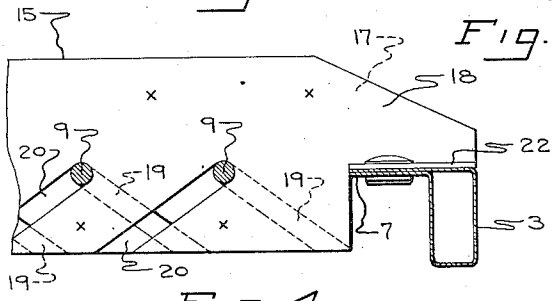


Fig. 4

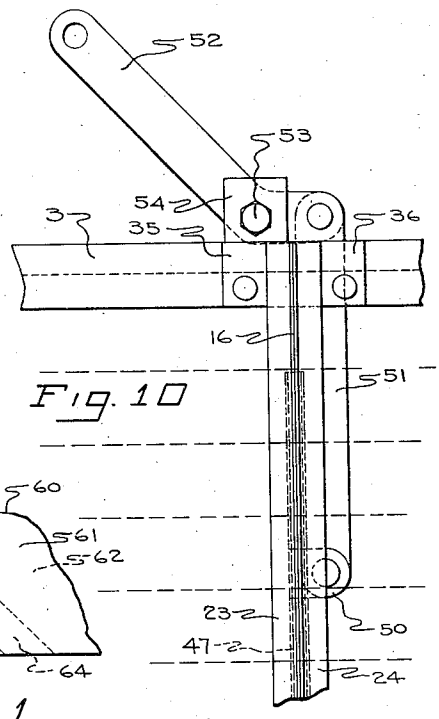


Fig. 10

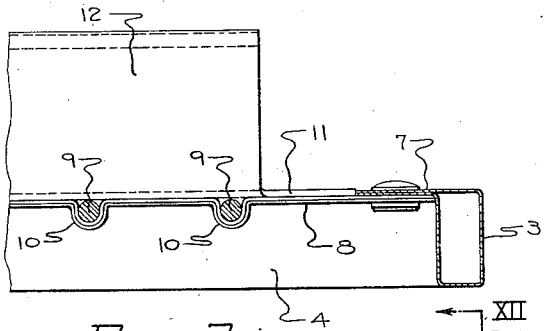


Fig. 3

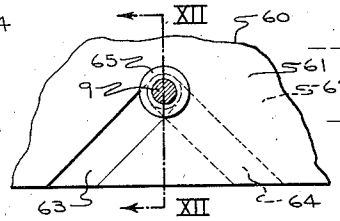


Fig. 11

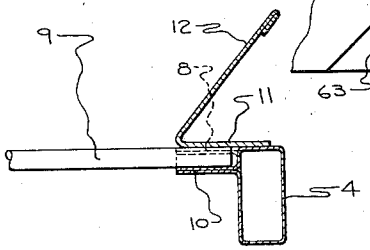


Fig. 5

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SHEET METAL SIEVE CONSTRUCTION FOR HARVESTERS

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Application November 25, 1940, Serial No. 366,956

14 Claims. (Cl. 209—394)

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The present invention relates to grain sieves for threshers and harvesters and more particularly to structural details of the construction thereof.

Sieves according to the present invention are broadly well known and are employed in the harvesting of a wide variety of grains and like crops. The advantages of the present invention deal more with structural features than with functional results. The invention relates to chaffers which are sieves for the preliminary cleaning of the coarser material from grain, as well as to the final sieves known as shoe sieves.

An object of the present invention is to provide a sieve of the character described having slat supporting rods provided with integral cranks for adjusting the slats.

Another object of the invention is to provide a sieve of the character described having a frame of tubular sheet metal provided with integral flanges for supporting the slat mounting rods.

Still another object of the invention is to provide a frame for a sieve of the character described having slat mounting rods supported thereon, and trough members having portions for holding said rods in position.

A further object of the invention is to provide novel means for supporting the slat mounting rods intermediate their ends.

A still further object of the invention is to provide novel means for assembling the slat tilting mechanism.

A still further object of the invention is to provide a novel means for securing the slats to their mounting rods.

These and other objects residing in the arrangement, combination and construction of the parts will be apparent from the following specification when taken with the accompanying drawings in which:

Fig. 1 is a plan view of a sieve according to the present invention, showing only a small portion of the sifting surface provided by the sifting slats, the balance of the surface being indicated diagrammatically,

Fig. 2 is a section on the line II—II of Fig. 1,

Fig. 3 is a section on the line III—III of Fig. 1, omitting a showing of the slats for clarity of detail,

Fig. 4 is a section on the line IV—IV of Fig. 1, omitting a showing of the slats for clarity of detail,

Fig. 5 is a section on the line V—V of Fig. 1, omitting a showing of the slats for the purpose of clarity of detail,

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Fig. 6 is a section on the line VI—VI along one of the slat supporting rods showing only the slat supported by the rod along which the section is taken.

Fig. 7 is a section on the line VII—VII of Fig. 6,

Fig. 8 is a section on the line VIII—VIII of Fig. 6,

Fig. 9 is a section taken on the line IX—IX of Fig. 6,

Fig. 10 is a fragmentary portion of Fig. 1 showing a detail of the seat tilting mechanism,

Fig. 11 is a partial side elevation corresponding to Fig. 4 showing an alternative form of the same construction, and

Fig. 12 is a section on the line XII—XII of Fig. 11.

The cleaning of grain by sieves according to the present invention is accomplished by passing the chaff laden grain over moving sieves through which the grains fall, while the refuse is carried over and blown away by a blast of air directed beneath the sieves. The first of the sieves is known as the chaffer and is provided with larger openings than those provided for the following sieve known as the shoe sieve. The chaffer removes the coarser material which passes over it while the grain and small refuse falls through upon the shoe sieve directly below. The shoe sieve separates the grain from the remaining chaff and refuse.

Sieves according to the present invention may be employed on threshers or harvesters and are adjustable in order to avoid the necessity of changing sieves whenever different crops or cleaning conditions are encountered.

Referring particularly to the drawings, the reference character 1 indicates a frame having a front bar 2, a rear bar 3, and side bars 4. The front bar 2 is shown in cross section in Figs. 2 and 3, and is tubular in form, provided with a rearwardly extending flange 5. The front edge of the bar 2 is provided with a sloping surface 6, which constitutes the entering edge of the sieve to guide chaff laden grain onto the sieve. The rear bar 3, shown in cross section in Figs. 3 and 4, is tubular and provided with a rearwardly extending flange 7. The tubular side bars 4, one of which is shown in cross section in Fig. 5, are provided with inwardly extending flanges 8. It will be observed that the flanges 5, 7 and 8 of the bars 2, 3 and 4 respectively, consist of integral extensions of the edges of the body material of the bars 2, 3 and 4. Preferably the side bars 4 and the rear bar 3 are integral, being formed by shaping a single member.

Disposed transversely on the frame 1 are a plurality of parallel rods 9. The rods 9 are mounted for rotation about their longitudinal axes in recesses 10, shown in Figs. 3 and 5, formed in the flanges 8 of the side bars 4. The rods 9 are secured against removal from the recesses 10 by strips 11, secured to the flanges 8 as by spot welding for instance. The strips 11 comprise integral portions of trough sides 12 for the sieve, the trough sides 12 extending upwardly and outwardly as disclosed particularly in Figs. 3 and 5. It will be understood that the trough sides 12 serve to maintain chaff laden grain on the sieve and when chaff laden grain is deposited on the sieve from above to guide the same onto the sieve surface.

The rods 9 are supported intermediate their ends by bars 15 and 16. The advantage of the bars 15 and 16 is that during the assembling of the parts of the sieve, due to their inherent nature, they may be readily assembled in supporting relation with the rods 9. The bar 15 consists of plates 17 and 18, the plate 17 being provided with diagonal slots 19 and the plate 18 being provided with diagonal slots 20. As shown particularly in Fig. 4, the slots 19 are parallel to each other and the slots 20 are parallel to each other, and when the plates 17 and 18 are in assembled relation, the slots 19 and 20 are in converging relation with their inner ends in lateral alignment. In the production of sieves according to the present invention, after the rods 9 have been assembled with respect to the side bars 4, the plate 17 is disposed independently over the rods 9 and the plate 18, independently of the plate 17, is disposed over the rods 9, in the first instance the rods 9 sliding relatively into the slots 19 and in the second instance the rods 9 sliding relatively into the slots 20. As soon as the plates 17 and 18 have been assembled with the rods 9 and disposed side by side as disclosed in Figs. 1 and 4, they are spot welded together and ears 21 and 22 with which the plates 17 and 18 are integrally provided are riveted to the webs 5 and 7 of the bars 2 and 3 respectively, as shown in Figs. 1 and 4.

The rods 9 are also supported intermediate their ends by plates 23 and 24, shown in Figs. 1, 2 and 6. The plates 23 and 24 are formed to provide upper portions 25 and 26 which abut each other and lower portions 27 and 28, which are spaced, as shown in Fig. 6. The lower portion 27 is provided with bayonet slots 29, extending toward the rear of the sieve and the lower portion 28 is provided with bayonet slots 30 extending toward the front of the sieve. It will be understood that there is one bayonet slot in each of the lower portions 27 and 28 for each of the rods 9. The plates 23 and 24 are assembled on the rods 9 with the rods 9 disposed at the ends of the respective bayonet slots. The portions 25 and 26 of the plates 23 and 24 are disposed in abutting relation, as shown in Fig. 6 and spot welded together, and ears 35 and 36 with which the plates 23 and 24 are provided respectively are riveted to the flanges 5 and 7 of the bars 2 and 3 respectively.

It is to be understood that before the rods 9 are assembled on the frame 1, they are provided with sifting slats 37, shown particularly in Figs. 1, 2, 6 and 9. The slats 37 are provided at one edge thereof with teeth or fingers 38 and at the other edge thereof with stiffening ribs 39. Immediately inwardly of the stiffening ribs 39 are depressions 40, shown most clearly in Fig. 9. The

slats 37 are conventional in design except for the stiffening ribs 39, although they are secured to the rods 9 in a novel manner. As will be apparent from Fig. 1, each rod 9 is provided with three slats, the slats being separated by the bars 15 and 16. Each slat is provided with one or more off-set portions 41 intermediate the front and back edges thereof. The portions 41 are formed by making slits 42 in the slats 37, and depressing the portions therebetween. Each rod 9 may then be disposed between the portions 41 and the undersides of the slats 37. The slats 37 are maintained against rotating with respect to the rods 9 by suitable spot welding.

As shown particularly in Fig. 2, the slats 37 have the rear portions thereof disposed at an angle to the front portions thereof, and the teeth 38 and the rods 9 are spaced so as to dispose the slats 37 in overlapping relation, as shown in Figs. 1 and 2. It is preferred that the individual teeth 38 be formed of downwardly concave cross section. Straight slats 43 are secured to the flange 5 of the bar 2 at the front of the frame by rivets 44 and are provided with teeth 45 similar to the teeth 38.

The slats 37 are adjustable by oscillating the rods 9 about their longitudinal axes. For oscillating the rods 9, each of the rods 9 is provided with an integral crank 46, shown particularly in Figs. 2 and 6. The cranks 46 all extend in the same direction and are moved in unison by a bar 47. The bar 47 consists of a strip of sheet metal formed into a member of U shaped cross section and provided along the lower edge thereof with a series of slots 48, extending upwardly from the closed edge of the U section. Each of the cranks 46 is disposed in a slot 48 and is maintained therein by a securing wire 49 which extends along on the inside of the lower edge of the U shaped bar 47 beneath the lower side of the cranks 46, as shown particularly in Fig. 2. It will be clear from Figs. 2 and 6, that the bar 47 may be readily assembled with respect to the cranks 46 by placing the same over the cranks 46 and inserting the wire 48.

Any suitable structure may be provided for moving the bar 47. In Fig. 10, one form of construction is disclosed which consists of an ear 50, secured to the bar 47. Pivoted to the ear 50 is a link 51 in turn pivoted to a bell crank lever 52, which is mounted for oscillation about a pin 53, the pin 53 being mounted in a bracket 54. By swinging the bell crank lever 52, about the pin 53, it will be evident that the bar 47 may be reciprocated to adjust the angularity of the cranks 46 and thus change the openings provided between the slats 37. The adjustability of the slats 37 makes it possible to adjust the character of the sieve for various types of crops or cleaning conditions. In practice, the bell crank lever 52 is connected to actuating mechanism operable from the outside of the machine, not shown, with which the sieve is associated and suitable locking means for fixing the adjustment is provided.

In operation, sieves according to the present invention are mounted in the thresher or harvester with which they are associated in association with mechanism for vibrating them from front to rear, as will be understood by those skilled in the art. Also, a fan or other means, not shown, is provided for creating a blast of air which is directed beneath each sieve from adjacent the front frame bar 2. As the air passes beneath the sieve, it passes upwardly

through the sifting surface provided by the slats 37, being deflected upwardly by the rear downwardly inclined portions of the slats 37, shown particularly in Fig. 2. The sieve structures are mounted so that when they are inclined slightly downwardly from front to back so that as they are vibrated the coarse material works its way over the sieves from front to back and the lighter material is carried upwardly by the blast of air from beneath the sieve. The heavier grain passes downwardly over the rear portions of the slats 37, the depressions 40 and the stiffening ribs 39 serving to slow up the rate of movement of the grain to permit the lighter chaff to be carried upwardly by the air blast. While the threshing of grain has been mentioned, it will be understood that other crops than grain which are commonly threshed may be sifted with the sieves according to the present invention.

An alternative form of the bar 15 composed of the plates 17 and 18 is disclosed in Figs. 11 and 12. In this form there is provided a bar 60 composed of plates 61 and 62. The plate 61 is provided with a plurality of longitudinally spaced slots 63, one of which is shown, projecting inwardly from a longitudinal edge of the plate 61 in one direction and the plate 62 is provided with a plurality of similarly spaced slots 64 extending in from a longitudinal edge of the plate 62 in another direction. The inner ends of the slots 63 and 64 are in lateral alignment, the slots 63 and 64 being similar to the slots 19 and 20 of the bar 15. Each slat supporting rod 9, instead of being supported directly by the plates 61 and 62 as would have been done in the case of the bar 15 construction, is supported by a grommet 65. The slots 63 and 64 are disposed, as shown in Figs. 11 and 12, over the annular channel 66 of the grommet 65. The grommets 65 provide better bearings for the slat supporting rods 9 than the construction shown in Fig. 4.

While the bars 2, 3 and 4 have been shown as consisting of hollow tubular sheet metal members, it is to be understood that the bars 2, 3 and 4 may have the sheet metal thereof formed about a core of some fibrous material for instance. Such a composite fibrous and sheet metal member is shown in Patent No. 2,211,643. Accordingly, the expression "tubular sheet metal bars" as used in the claims is considered to mean that the sheet metal is tubular in form, either with or without a core.

It will be apparent from the foregoing specification that the parts of the sieve according to the present invention may be readily assembled, thereby facilitating the manufacture thereof. Furthermore, it will be understood that the teeth 38 and 45 may be varied in character as desired to accommodate the crops and cleaning conditions encountered. Also, in each thresher or harvester, it is to be understood that the slats for the so-called shoe sieve and chaffer each have differently designed teeth as is well understood in the art. Accordingly, in the claims, it is intended that the term "sieve" be broadly construed so as to include both shoe sieves and chaffers, as well as any sieve not so specifically designated.

Having thus described our invention, what we desire to secure by Letters Patent and claim is:

1. In a sieve, a plurality of slat rods having crank portions, a crank actuating bar having a plurality of spaced slots in one edge thereof into which said cranks are received, and a removable retaining member for locking said cranks in said slots, said member being carried by said bar along one edge and projecting across said slots beneath said cranks.

2. A sieve of the character described comprising a frame, a plurality of transversely extending parallel rods mounted in said frame for rotation about their respective axes, sifting slats secured to said rods, said slats being connected to said rods so as to lie in parallel planes and to provide a sifting surface, an integral loop in each of said rods comprising a crank, a crank actuating bar comprising a folded strip of sheet metal of U shaped cross section, a plurality of crank receiving slots in said bar extending inwardly from the closed edge of said bar, a crank retaining member projecting between the side walls of said bar and retained therein by the closed edge of said bar, and means to move said bar longitudinally to turn said rods about their axes to adjust said slats to vary the sifting characteristics of the sifting surface formed thereby.

3. In a sieve of the character described having crank rods regulating the elements of the sieve and offset crank portions defined in the rods, a sheet metal actuating member for the crank rods having axially spaced slots defined along the edge thereof in which the crank portions are received, said edge being folded, and an axially extending element secured in the fold of said edge and bridging said slots to confine the crank portions in said slots.

4. A sieve of the character described comprising a frame, a plurality of transversely extending parallel rods mounted in said frame for rotation about their respective axes, sifting slats secured to said rods, said slats being connected to said rods so as to lie in parallel planes and to provide a sifting surface, means to oscillate said rods about their respective axes to adjust said slats to vary the sifting characteristics of the sifting surface formed by said slats, and means to support said slats intermediate their ends, said means comprising a pair of parallel members secured together, one of said members having a plurality of slots extending inwardly from one edge thereof in one direction, and the other of said members having a plurality of slots extending inwardly from one edge thereof in another direction, the inner ends of said slots terminating at laterally aligned points, said rods projecting through said slots at said inner ends thereof.

5. A sieve of the character described comprising a frame, a plurality of transversely extending parallel rods mounted in said frame for rotation about their respective axes, sifting slats secured to said rods, said slats being connected to said rods so as to lie in parallel planes and to provide a sifting surface, a crank connected to each of said rods, said cranks extending in the same direction and being in alignment, means to simultaneously actuate said cranks to turn said rods about their axes to adjust said slats to vary the sifting characteristics of the sifting surface formed thereby, and means to support said slats intermediate their ends, said means comprising a pair of parallel members secured together along one edge and separated one from the other along the other edge, one of said members having a plurality of slots extending inwardly from the free edge thereof in one direction and the other of said members having a plurality of slots extending inwardly from the free edge thereof in another direction, the inner ends of said slots terminating at laterally aligned planes, said rods projecting through said slots at the inner ends

thereof and said cranks and actuating means therefor being disposed between the spaced portions of said members.

6. In a sieve of the character described, slats having shafts, a sheet metal tubular border frame with an inwardly extending flange having integral depressions defined in a face thereof for receiving said slat shafts, and a member disposed over said depressions for maintaining said slat shafts therein.

7. In a sieve of the character described, slat structure comprising a rod, a member having a slot extending from an open edge thereof in one direction, another member having a slot extending from an open edge thereof in another direction, the inner ends of said slots terminating at laterally aligned points, a grommet in which said rod is supported, located in said slots at the inner ends thereof and supported thereby, and means to fixedly secure said members together, whereby said rod projecting through said grommet is supported for rotation and against lateral displacement.

8. An all metal sieve for grain, used in threshers and harvesters, and characterized by its ability to withstand violent vibration having a generally rectangular frame, comprising members of sheet metal shaped to define an outer border of tubular structural configuration, and an inner border of flanged configuration having longitudinally spaced, laterally extending bearing depressions formed therein, and slat structure secured to and supported from said inner flanged border.

9. In the combination set forth in claim 6 wherein said member has a portion overlying said flange to form a bearing for said shafts, another portion of said member being angularly disposed to provide a trough.

10. In a sieve of the character described, a frame having opposite side members, each of said frame side members having a body portion formed of an upright section of thin sheet metal with flange portions on the upper and lower edges of said sections which flange portions extend inwardly of the frame, and sieve slats having shafts supported by the upper flange portions of said frame side members and having journalled connection therewith.

11. In a sieve of the character described, a frame having opposite side members, each of said frame side members having a body portion formed of an upright section of thin sheet metal with flange portions on the upper and lower edges of said sections which flange portions extend

inwardly of the frame from the upright section, pivot sockets embossed in the upper flange portions of the side members, and sieve slats having shafts journalled in the sockets for pivotally supporting said slats in the frame.

12. A sieve of the character described comprising a frame, said frame having side bars of tubular sheet metal members, said members having inwardly extending integral flanges with integral depressions defined in a face thereof, slats having shafts seated in said depressions, and a member disposed over said depressions for maintaining said slat shafts therein.

13. In a sieve of the character described a sheet metal frame of substantially rectangular shape having side bars of tubular sheet metal members provided with inwardly extending integral flanges, structural parts super-imposed upon said flange portions, depressions in at least one of said super-imposed parts to define a spaced-apart series of bearing openings along each side bar, and slat structure made up of a plurality of spaced-apart swingable slats having bearing portions in the depressions to be supported between the said side bars and held in place by the super-imposed elements, whereby the flange serves the double purpose of reinforcing the side bars and frame to resist twisting and vibrational strain and at the same time serves as a support for the slat structure.

14. In a sieve of the character described having a plurality of spaced-apart swingable slats provided with bearing portions, a slat supporting structure comprising a pair of sheet metal members assembled in juxtaposition, each of said sheet metal members having passageways extending inwardly from one edge and terminating in bearing portions, the passageways of one sheet metal member having an inward and longitudinal component in one direction and the passageways of the juxtapositioned member having an inward and longitudinal component in the opposite direction, whereby said sheet metal members can be mounted upon an assembled slat structure by relative movement in opposite directions and parallel planes so that the bearing portions of the slats are disposed in cooperating bearing portions at the inner ends of the passageways of the pair of sheet metal members and the open ends of the passageways of each member are closed by solid portions of the juxtapositioned sheet metal member.

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