Nov. 20, 1956 E. K. KARLSSON ET AL 2,771,077

SHEET METAL FABRICATED CYLINDER BAR AND CONCAVE

Filed Aug. 13, 1953

2 Sheets-Sheet 1

FIG. 1

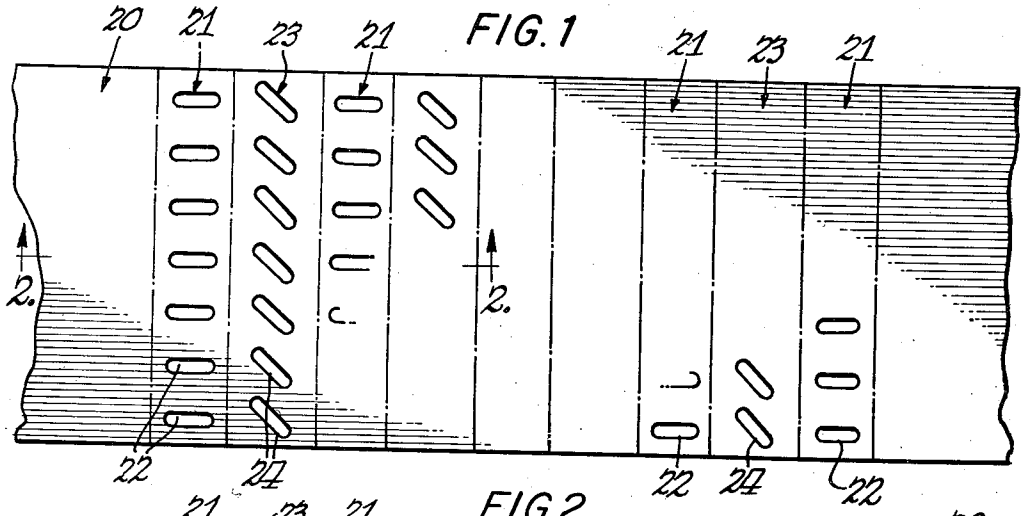


FIG. 2

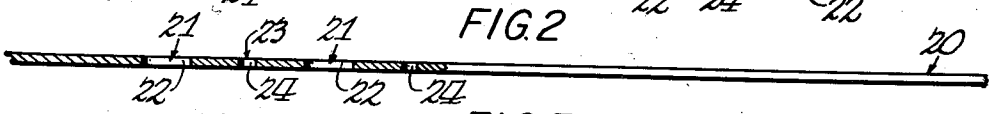


FIG. 3

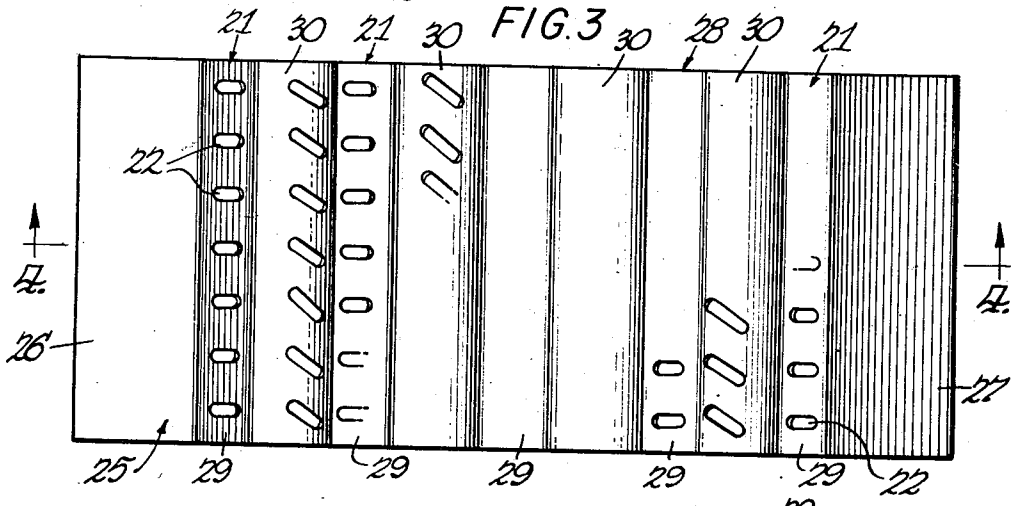


FIG. 4

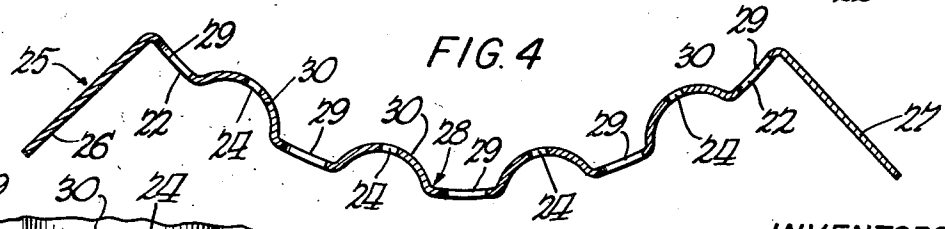
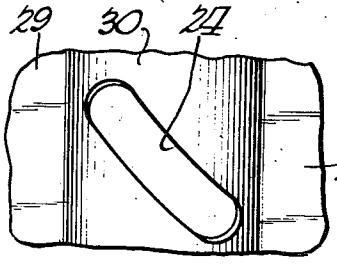


FIG. 5



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FIG. 6

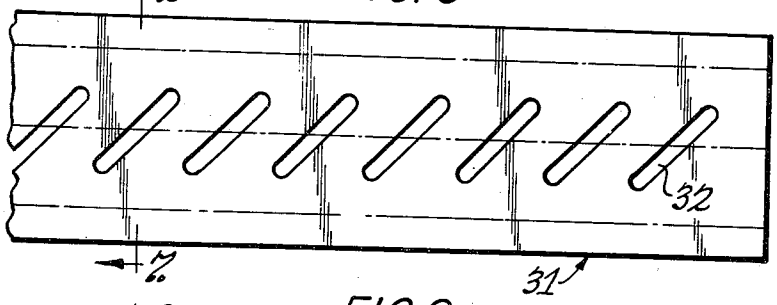


FIG. 7

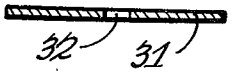


FIG. 8

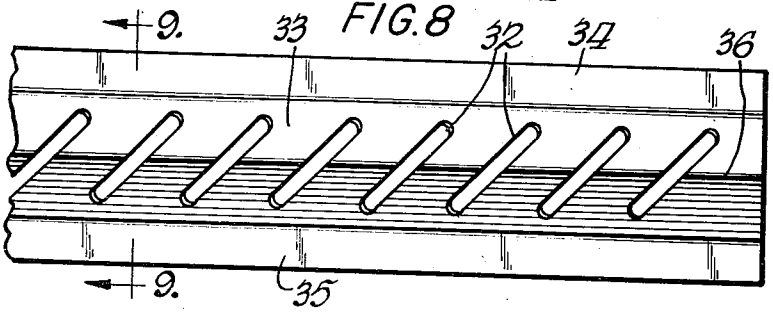


FIG. 9

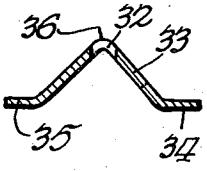


FIG. 10

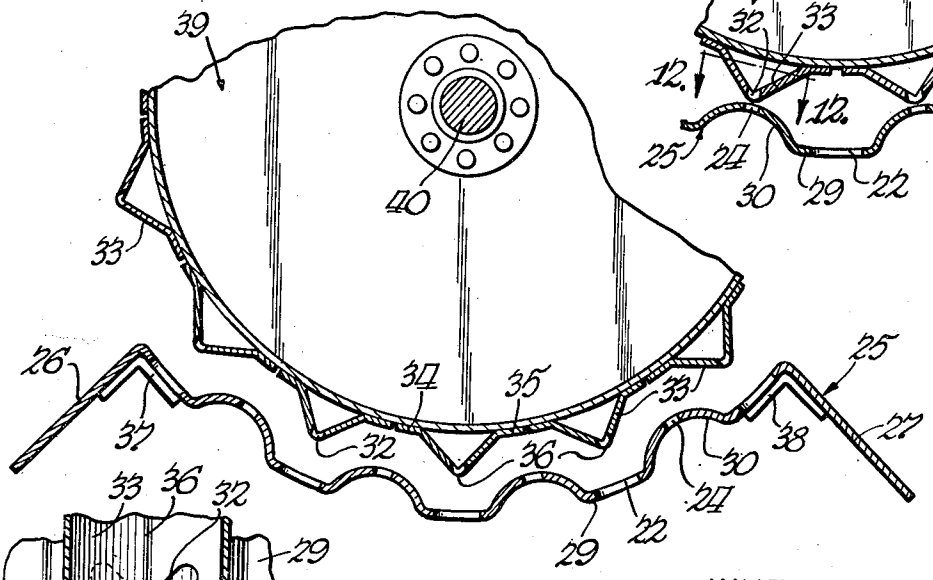
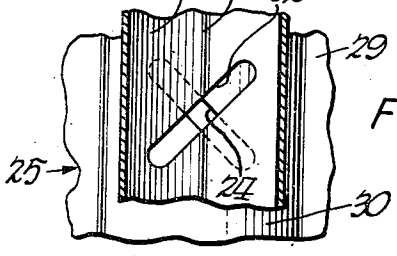


FIG. 11

FIG. 12



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SHEET METAL FABRICATED CYLINDER BAR AND CONCAVE

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Application August 13, 1953, Serial No. 373,952

2 Claims. (Cl. 130—27)

This invention relates to a new and improved sheet metal fabricated grain threshing cylinder and concave.

Threshing machines employ cooperating cylinders and concaves for the purpose of removing kernels of grain from their husks. In the past both the cylinders and concaves have been made from relatively massive forgings or castings which were difficult to manufacture with uniformity of results. The modern harvester thresher employs relatively wide cylinders and concaves and the problem of securing exact spacing between the cylinder and concave throughout their entire widths is extremely difficult especially in view of the irregular service conformations thereof.

It is, therefore, a principal object of this invention to provide a sheet metal fabricated grain threshing cylinder and concave which is manufactured by a metal stamping process including accurately tooled dies whereby uniform surface conformations may be made in the cylinder and concave resulting in uniform spacing of the cylinder from the concave across the full widths thereof.

An important object of this invention is the provision of a light-weight cylinder and concave for threshing machines.

Another important object of this invention is to supply threshing concaves with a plurality of apertures therein and subsequently formed by bending with the apertures located in a particular pattern thereon, and similar apertures being arranged on similar geographical locations on the concave.

Another and further important object of this invention is to provide a method of fabricating threshing cylinders and concaves from a sheet of flat metal stock and performing successive operations thereon resulting in a light-weight apertured concave and a light-weight apertured cylinder rib for cooperation with each other in a manner to effectively thresh grain.

Still another important object of this invention is to supply a sheet metal fabricated concave with cooperating sheet metal fabricated cylinder ribs both of which have elongated angularly disposed apertures therein, and the elongated apertures arranged in rows over the surface of transverse ribs formed on the concave and over the surface of the cylinder ribs, and the elongated apertures in the cylinders and concaves being oppositely angled whereupon the relative rotation of the cylinder with the concave causes complete threshing of grain disposed intermediate the concave and cylinder.

Another and still further important object of this invention is to provide a sheet metal fabricated concave formed as a part of a circle and having transversely disposed raised ribs thereon longitudinally spaced apart, and the concave equipped with a plurality of elongated apertures arranged in a series of alternating rows of longitudinally extending apertures and diagonal apertures, and the concave further characterized by the raised rib portions having the diagonal slots therein.

Other and further important objects and advantages

will become apparent from the disclosures in the following specification and accompanying drawings.

In the drawings:

Figure 1 is a top plan view of a flat piece of sheet metal stock having a plurality of apertures stamped therein;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a top plan view of the device of Figures 1 and 2 after formation of the device into the shape of a part of a circle;

Figure 4 is a sectional view taken on the line 4—4 of Figure 3;

Figure 5 is an enlarged top view detail of a portion of the device as shown in Figure 4;

Figure 6 is a top plan view of a flat piece of apertured metal stock;

Figure 7 is a sectional view taken on the line 7—7 of Figure 6;

Figure 8 is a top plan view of the device of Figures 6 and 7 after it has been bent to form a cylinder rib;

Figure 9 is a sectional view taken on the line 9—9 of Figure 8;

Figure 10 is a transverse sectional view of a portion of the assembly of a cooperating threshing cylinder and concave of this invention;

Figure 11 is a detail view of a portion of the device of Figure 10 with the cylinder rotated relatively to the concave in such a manner that the ribs of the cylinder and concave are directly opposing each other; and

Figure 12 is a sectional view taken on the line 12—12 of Figure 11 and showing the relative angular disposition of the apertures of the fabricated cylinder ribs and fabricated concave ribs of this invention.

As shown in the drawings:

The reference numeral 20 indicates generally a flat sheet of metal, such as steel or the like. The sheet of metal is used in the fabrication of a concave for threshing machines. The first step in the manufacturing process is to stamp a plurality of apertures therein. The apertures are relatively elongated and are positioned in transversely disposed rows which are longitudinally spaced apart. As shown in Figure 1, the first transverse row of apertures 21 comprises a plurality of spaced elongated longitudinally extending apertures 22. The succeeding row of apertures 23 is composed of a plurality of elongated diagonally disposed apertures 24. Throughout the length of the flat piece of sheet metal stock there is an alternating row of longitudinally and diagonally extending elongated apertures, and for convenience these spaced rows of alternate aperture inclination will be designated the same throughout. In other words, the alternate rows of longitudinally extending apertures will continue to be designated as rows 21 and the diagonally disposed alternate rows will have the designation 23. Similarly, all longitudinally extending apertures or openings will be identified by the numeral 22 and the diagonal or angularly inclined openings will be identified by the numeral 24.

The succeeding step in the fabrication of the concave is to form the flat, hole stamped sheet metal into the shape of a concave. As stated above, concaves and their cooperating cylinders have heretofore been made by costly procedures including forgings and castings whereas in the present invention the cooperating threshing elements are formed by stamping and forming dies which may be accurately tooled to thus reproduce identical pieces for use as concaves and cylinder ribs. Such uniformly made concaves and cylinders contribute to effective threshing and ready interchangeability of concaves and cylinders in mass produced threshers. The formed and stamped con-

cave is shown in Figures 3 and 4 and identified as numeral 25. The opposed end portions 26 and 27 are bent downwardly and outwardly and comprise the means for fastening the concave 25 within a frame supporting structure. The intermediate portion 28 of the concave 25 between the end parts 26 and 27 is conformed generally to the shape of a part of a circle. This portion 28 constitutes the concave proper against and by which grain is threshed. The surface conformations of this portion 28 thus materially contribute to the successful operation of the device as a threshing means. Alternating longitudinally spaced apart segments 29 of the concave 28 are relatively flat but have the general curvature of the entire concave portion 28. These flat segments 29 comprise the rows 21 of the flat sheet of stock as shown in Figure 1. Consequently, these segments 29 coinciding with the rows 21 thus also contain the elongated longitudinally extending apertures 22.

Intermediate the segments 29 there are alternate segments 30 which are raised upwardly across the entire width of the concave. These raised segments 30 constitute ribs which enable a cylinder in cooperation therewith to cause threshing of grain therebetween. The ribs 30, as shown in the drawing, are curved upwardly in substantially semicircles so the elongated diagonally disposed apertures 24 in the surface thereof are similarly curved downwardly and outwardly in both directions about an apex line of the rib. This is clearly shown in Figure 5 which depicts an enlarged detail of a top plan view of one of the formed ribs 30 having the aperture 24 in the surface thereof. Obviously when the apertures 22 and 24 are stamped in the flat sheet metal the side walls of the apertures are disposed at right angles to the surface of the sheet metal. However, subsequent to the bending and forming of the flat sheet apertured metal into the concave, as shown in Figures 3, 4 and 5, the apertures too are bent to the surface conformation of the concave, resulting in a more effective and aggressive threshing surface. The bending of the concave and the resultant bending and distortion of the elongated apertures exposes the various side edges of the apertures at various angles, thus insuring positive grasping of the grain husks and the pulling or tearing removal of the husks from the grain.

Figures 6 through 9, inclusive, show the fabricated ribs as used on the cylinder which will cooperate with the fabricated concave as shown in Figures 1 through 5. A flat sheet of metal 31 is stamped with a plurality of longitudinally spaced apart and longitudinally aligned elongated diagonal apertures 32. Subsequent to the stamping of the apertures 32, the flat sheet of metal 31 is formed as a rib, as shown in Figure 9, with the central portion thereof bent upwardly in a substantially V-shape, as shown at 33, and the lateral edges thereof 34 and 35 being flat. The flat side edges 34 and 35 enable the rib to be joined to the outer circumferential surface of a threshing cylinder. The raised rib 33 has a relatively sharp peak 36 along the top and center thereof causing the elongated apertures 32 to be bent downwardly on each side of the center portion 33. Thus when the rib of Figures 8 and 9 is in operative position with respect to the fabricated concave of Figures 3 and 4 there will be a positive shearing action between the apertures in the rib with the apertures in the concave resulting in clean threshing of grain being fed therethrough.

As shown in Figure 10 the fabricated concave of Figures 3 and 4 is mounted on stationary frame members 37 and 38 by the end members 26 and 27 being hooked thereover and, for illustrative purposes, a cylinder 39 journally mounted on a shaft 40 which is supported in a thresher housing (not shown) is arranged for cooperative relationship with the fixed concave. The cylinder 39 is provided with regularly spaced apertured fabricated ribs positioned around and welded or otherwise attached to the outer circumference thereof so that upon rotation of the cylinder 39 grain passing between the elements is threshed by the relative motion of the ribs of the cylinder over the apertured ribs of the concave. Figure 11 is a small detail view similar to Figure 10 but with the ribs of the cylinder in direct alignment with the ribs of the concave. A sectional view has been taken from Figure 11 in order to construct Figure 12 wherein it is shown the diagonally disposed apertures 24 in the concave and 32 in the cylinder ribs are oppositely inclined in order to accomplish the desirable grain husking action of an effective cylinder and concave thresher.

It will thus be seen that the present invention is directed to a sheet metal fabricated cylinder and concave and also the method of accomplishing the fabrication. The resultant product is economical to manufacture and yet is a cylinder and concave uniform to a degree not heretofore obtainable in forged or cast articles which of necessity had to be individually machined. Further, the employment of alternately disposed rows of longitudinally extending and diagonally extending elongated slots contributes to effective threshing and, still further, when the opposing ribs of the cylinder and concave are formed with their respective raised portions, the oppositely disposed diagonal slots are sufficiently distorted to result in cooperative elements which are conducive to the most efficient grain threshing.

Numerous details of construction may be varied throughout a wide range without departing from the principles disclosed herein and we, therefore, do not propose limiting the patent granted hereon otherwise than as necessitated by the appended claims.

What is claimed is:

1. A sheet metal fabricated grain threshing cylinder and concave comprising a sheet metal concave with surface conformations defining transversely disposed raised rib portions and said sheet metal concave having a plurality of apertures therethrough, at least some of said apertures disposed at an acute angle with respect to and located in said raised rib portions, and a sheet metal cylinder including a rib formed thereon and having a plurality of apertures therethrough, said apertures in the cylinder ribs disposed at an acute angle with respect to said rib and in a direction opposite to the angular disposition of the apertures in the concave raised rib portions whereby when the rib portions on the concave and the ribs of the cylinder cooperate in opposition to each other grain is effectively threshed therebetween.

2. A device as set forth in claim 1 in which said concave has other apertures therethrough located intermediate said rib portions and disposed longitudinally.

References Cited in the file of this patent

UNITED STATES PATENTS

1,282,408	Gaylord et al.	Oct. 22, 1918
1,859,138	Haba	May 17, 1932
1,983,300	Mitchell	Dec. 4, 1934
2,127,270	Schaaf	Aug. 16, 1938
2,159,664	Lindgren	May 23, 1939
2,217,327	Zeidler	Oct. 8, 1940
2,321,019	Dray	June 8, 1943
2,361,633	Jones	Oct. 31, 1944

FOREIGN PATENTS

257	Great Britain	1858
910,279	France	Jan. 21, 1946