June 1, 1943. H. MAGINN 2,320,945

THRESHER CYLINDER CONSTRUCTION

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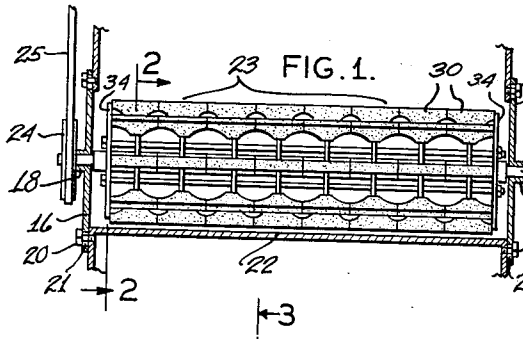


FIG. 1.

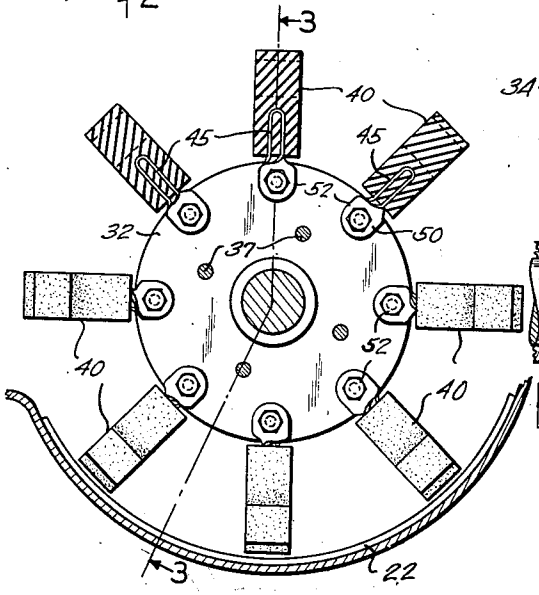


FIG. 2.

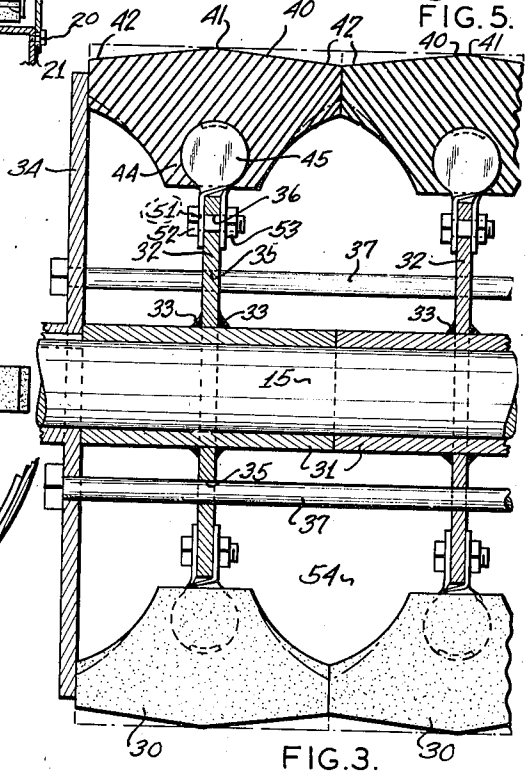


FIG. 3.

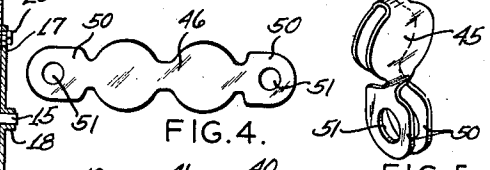


FIG. 4.

FIG. 5.

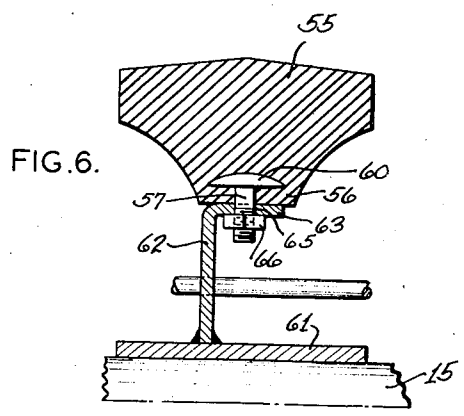


FIG. 6.

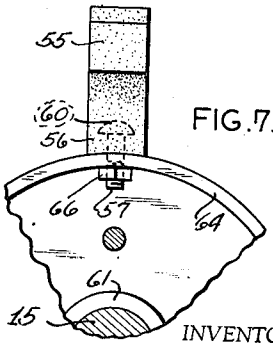


FIG. 7.

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June 1, 1943. H. MAGINN 2,320,945

THRESHER CYLINDER CONSTRUCTION

Filed May 21, 1941 2 Sheets-Sheet 2

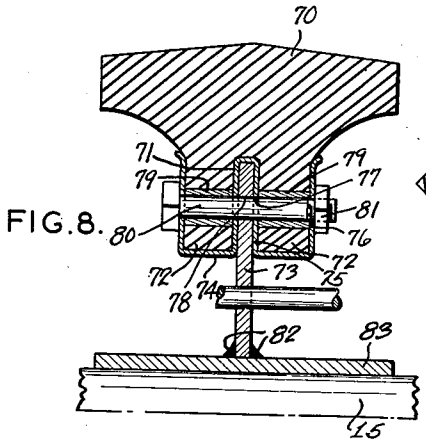


FIG.8.

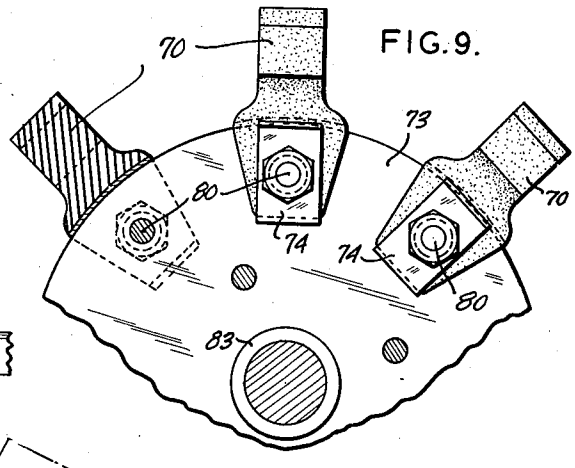


FIG.9.

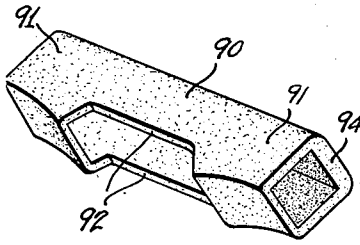


FIG.10.

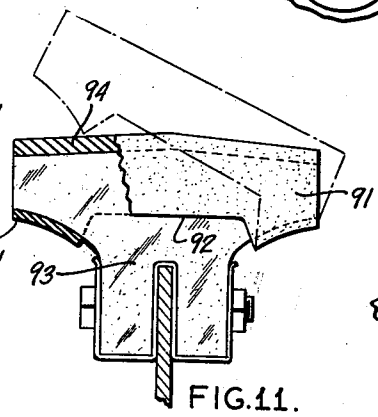


FIG.11.

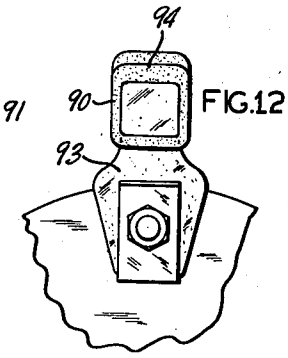


FIG.12.

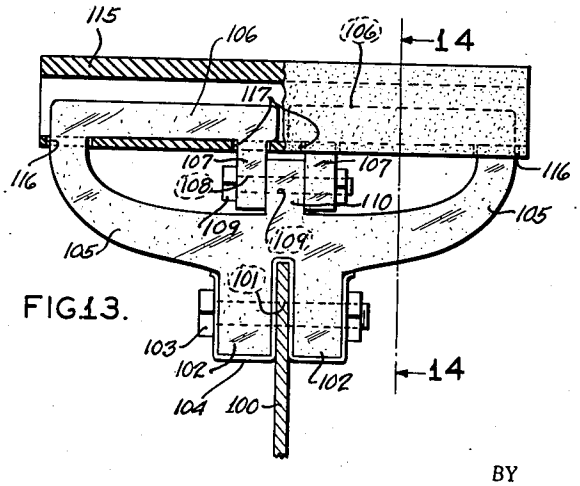


FIG.13.

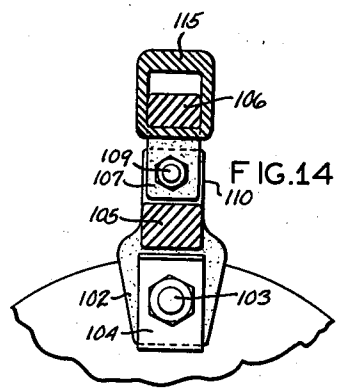


FIG.14.

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UNITED STATES PATENT OFFICE

2,320,945

THRESHER CYLINDER CONSTRUCTION

Harold Maginn, Waverly, Ill.

Application May 21, 1941, Serial No. 394,455

20 Claims. (Cl. 130—27)

This invention relates to improvements in thresher cylinder construction, and more particularly to improved means for assembling, for individual attachment, removal and replacement, a plurality of resilient threshing arms or bar sections to the body of a rotatable cylinder utilized in the separation of grain, beans, grass crops and the like.

The present application constitutes a continuation of the subject matter disclosed and claimed in my copending application Serial No. 259,089, filed March 1, 1939, and entitled Threshing cylinder assemblies. Attention is also directed to a companion application filed concurrently herewith by this applicant, and covering related improvements, bearing Serial No. 394,454 and filing date of May 21, 1941.

The general objects of the present invention are broadly similar in nature to those severally set forth in the two applications above identified. These include the provision, in keeping with the present and earlier filed applications, of an improved shaping and mounting of resilient beater arms or threshing elements in a bar-type cylinder, the form and resilient construction of which elements present several marked advantages over the conventional metal threshing elements of separator cylinders, and numerous other advantages over the metal-backed rubber elements heretofore recently sold to the trade to a considerable extent.

A general advantage of the present invention may be stated as attained in a softer threshing action, by which is meant a separation of the grain from appurtenant straw and hull portions by a more gentle engagement of threshing elements, rather than by the sharp impact heretofore administered to the grain when threshed either by metal bars or by metal-backed rubber elements.

A further general object of the invention is attained by present improvements in the provision of sectional cylinder bars the individual sections of which are yieldable either radially or angularly in any direction, whereby in the event hard objects such as stones find their way into the threshing zone, the improved cylinder will either yield in passing such objects, or will expel them, in most cases without serious damage, from the threshing zone.

Still another object of the invention is attained in an assembly having the advantages above noted, and yet which, in comparison with some former types of threshing cylinders, may be constructed at a much lower cost, serves to provide a greater ease of service attention, and a much lower parts-replacement expense. The facility for individual removal and replacement of worn or damaged bar-forming sections, materially reduces the out-of-service time heretofore required incident to comparable types of replacement attention to older threshing cylinders.

More specifically stated in reference to the structure which distinguishes the present improvements over those of the copending applications of this applicant, there may be noted the provision of improved assembly means between individual threshing bar sections, and a metal spider by which the bar sections are supported, the advantages of these improvements reflecting themselves in a lower initial cost of production, hence a lower sales cost per cylinder, and improved facilities for replacing worn threshing elements.

The foregoing and numerous other objects will be more fully apparent when the following detailed description is read in connection with the accompanying drawings of certain selected embodiments of present improvements. In the drawings:

Fig. 1 is a sectional elevation of a threshing cylinder assembly embodying the present improvements, and showing the cylinder in operative relation to a cylinder casing, concave structure and immediately appurtenant parts; Fig. 2 is a somewhat enlarged transverse sectional elevation as viewed along line 2—2 of Fig. 1; Fig. 3 is a sectional view taken in staggered planes parallel to the axis of revolution of the cylinder, and as viewed along line 3—3 of Fig. 2; Figs. 4 and 5 are, respectively, a plan view and a showing in perspective of an anchoring clip such as utilized in the construction of Figs. 2 and 3 for securement of the individual beater arms or threshing sections to a mounting spider therefor; Fig. 6 is a fragmentary sectional elevation taken in a plane intersecting the cylinder axis and showing a somewhat modified form of attachment between the beater arms and spider of each of the units in the cylinder; Fig. 7 is an elevation, partly in section, of the structure of Fig. 6, when viewed in plan at a right angle to that of Fig. 6; Fig. 8 is a partial sectional elevation of a further modified form of anchorage or assembly means for detachable securement of an individual beater arm or threshing bar section to the mounting spider and shaft; Fig. 9 is a fragmentary sectional elevation in a plane transverse to the shaft and axis of cylinder rotation, showing three of the individual beater arms with one

thereof shown in section Fig. 10 is an isometric view of a replaceable boot or sleeve adapted to be inserted over one of the individual resilient beater arms as a replaceable wearing member; Fig. 11 is a view similar to Fig. 8, but including a partial section of the wearing sleeve or boot in solid and hatched lines, and showing in dotted lines, the wearing boot in a position of partial application to or incomplete removal from the individual threshing arm; Fig. 12 is an ened elevation of the structure shown by Fig. 11, with the boot in a position of usage; Fig. 13 is a side elevation partly in section, of a further modified form of beater bar with a wearing boot in place thereon and shown partly in section, and Fig. 14 is a sectional view of the structure of Fig. 13, as taken along line 14—14 thereof.

Referring herein for completeness to the general cylinder assembly, this is or may be closely similar to the built up arrangement shown and described in copending application Serial No. 394,454. In Fig. 1 it will appear that the cylinder body including its threshing elements, is built up of eight (the number being optional) laterally stacked sections, horizontally disposed on the rotatable cylinder shaft 15. The shaft 15 is suitably journalled in end plates 16 and 17 provided with bearing portions 18. The end plates are secured to adjacent end wall parts of the cylinder housing structure through the provision of cap screws 20 extending through slots 21 in the end plates, the provision of slots serving to enable a moderate distance adjustment between the cylinder axis, hence its threshing elements, and the concave structure indicated generally at 22 as a part of the cylinder casing. Rotation or revolution of the cylinder, generally indicated at 23, is effected through a drive pulley 24 and a belt 25 driven from any suitable power takeoff pulley (not shown).

Referring now to the construction of the individual units or sections, each of which is indicated generally at 30, each such section by preference includes a shaft-engaging sleeve 31 centrally of which is mounted a spider 32 occupying the central area of the unit 30. Any suitable form of securement for assembly purposes may be provided between the sleeve 31 and spider 32, but this conveniently consists of fillet welds 33. The spider 32 may be of a rugged low cost construction when comprised of a circular disc of relatively heavy gauge, substantially as shown by Figs. 2 and 3. The manner of mounting the beater bars, bar sections or threshing arms on the spiders 32 will be hereinafter described in more detail in respect to the several variations of assembly described and claimed herein.

The cylinder 23 as before noted, is of built-up construction and the manner of assembly in the presently preferred forms, involves the use of a pair of end plates 34, each of which is keyed or otherwise angularly secured to the shaft 15. With the cylinder parts free of the housing, one of the end plates is secured to the shaft, following which the intermediate cylinder-forming units are stacked on the shaft by insertion of the shaft through their respective sleeves 31 preferably so as to bring the latter into end-abutting relation. The opposite end plate 34 is then applied over the shaft and keyed or otherwise fixedly secured thereto. It will be noted as a preference that each of the spiders, or in case the latter consist of heavy sheet metal discs as shown, such elements 32 are provided with a series, shown as four, of tie rod apertures 35, these apertures bearing a predetermined relation to an outer row of bolt openings indicated at 36 in Figs. 2 and 3, for the reception of the anchoring bolts for the individual arms, as will appear. The arrangement is such that when the openings 35 are aligned in the spiders of the several units, the plurality, say the four of the tie rods indicated at 37, may be inserted through the assembled units of the cylinder and through the opposite end plates thereof so as to bring the corresponding beater arms indicated generally at 40, into substantial alignment, lengthwise of the cylinder. When the nut is taken up on each of the several tie rods 37, it will appear that the desired plurality of threshing sections of the cylinder constituting its body, are angularly tied together and are kept in angular register, the individual sections being prevented from rotating relative to each other through the provisions of rods 37. The latter extending through the end plates 34, and these plates being keyed to the shaft 15, the cylinder body will rotate as a unit. It is here parenthetically noted that the provision of the tie rods 37 is of great advantage in imparting a suitable rigidity to the sectional cylinder structure, since the present improvements are preferably employed in a cylinder operating within a rotative speed range of the order of 1300–1600 R. P. M. The rods being of low cost, this provision enables the present improvements to be installed in many existing combines and separators without necessarily increasing shaft size, or when utilized in new equipment, this arrangement enables the use of a smaller shaft 15 than would be necessary were the individual threshing units 30 not thus operatively integrated.

Proceeding now to a more detailed discussion of one of the many suitable means for individual detachable assembly of the bar elements or beater arms 40 of each group or unit, to the spider therefor, it may be noted that each of the bars 40 is of a generally T-shape, being longer, in the direction of the axis, in its peripheral portion than in its inner portion, anchorage to the spider being effected through the latter part. It may also be noted that, as described and claimed in the concurrently filed application Serial No. 394,454, each of the bars or arms 40 is appreciably crowned, i. e., its center peripheral portion 41, when at rest, lies at a somewhat greater radial distance from the axis of rotation than do the end portions 42. This provision is made because of resilience of the rubber or rubber-like stock constituting each bar, and so that when the cylinder is rotated at speed, the portions 42 will, being only remotely supported, assume a position to bring the threshing surface or extreme periphery of each bar, to substantially a planar relation to the corresponding surfaces of corresponding bars in adjacent units.

In order best to provide for the occasional extreme deflection of the individual bars 40, each thereof is secured by a radially inner and axially intermediate portion 44. In this part is embedded, at the time of vulcanization or curing in the mold, an anchoring clip 45 (Fig. 5). The clip 45 is constructed of a relatively heavy gauge stiff metal stock of initial strip form, and is punched or otherwise suitably formed initially to constitute a blank 46 (Fig. 4). This blank is folded upon itself centrally, the fold resulting in a bight portion 47, and a shaping such as to bring the two legs of the resulting furcate structure into substantial parallelism, yet spaced from each other so as to receive the stock of the bar 40 in better anchoring

relation between the enlarged portions just below the bight of the clip. After the initial fold, the eye portions indicated at 50, (and which may be provided with apertures 51 at the time of punching) are kept in spaced parallel relation but preferably twisted through about a ninety degree angle, as will readily appear from Fig. 5. This brings the apertures 51 into register, and the spacing of now projecting portions 50 is such as to receive the perimetral seat for the bar clip, on spider 32, between the projecting portions of the legs of the furcate structure. It will now readily appear that an attachment bolt 52 engaging the apertures 51 and the opening 36 in the spider will, when the nut 53 is threaded up, serve with the clip, securely to attach the bar 40 to the spider.

It now becomes obvious that the substantial spacing between intermediate portions of adjacent units 30, as indicated at 54, enables not only a free circulation of air, as is desirable between the units, but enables ease of access of the hands and tools for detaching or replacing the individual bars 40 without necessarily disassembling the units from the cylinder as a whole.

In Figs. 6 and 7 there is shown a somewhat modified arrangement including individual bar-forming sections or beaters generally indicated at 55, and shaped approximately the same as the bars 40 above described. Embedded in the lower anchorage portion 56 of each of the bars 55 is a securement bolt 57 provided with a somewhat enlarged, mushroom head 60, the threaded shank of bolt 57 projecting radially inwardly of the bar 55. In this modification, a sleeve 61 on the shaft 15 serves to carry a somewhat modified spider 62 which is shown as welded to the sleeve. The spider 62 is characterized by a series of angulate bar-seat-forming portions 63 each of which projects preferably at about a right angle to the body 62 of the spider. If desired the series of sets 63 may be constituted by a continuous flange 64, best shown in part by Fig. 7. The individual seats for the several bars of the unit of this form are each apertured as at 65 to receive the bolt 57, and a nut 66 serves to complete the assembly.

Referring now to a somewhat further modified form of beater bar anchoring means, as shown by Figs. 8 and 9, and which may be regarded as a somewhat preferred form for commercial production and usage, the bar, generally indicated at 70, in this case has its anchoring portion intermediately slotted or kerfed as at 71, resulting in a furcate form of securement portion the furcations of which are identified with radially inwardly projecting legs 72. It is evident from Fig. 8 that the kerf or slot 71 is for the purpose of accommodating a peripheral portion of the spider 73 between the legs or furcations 72 of the beater bar. For better securement between the beater and spider, it is preferred to provide a metal saddle element 74, comprised, as will appear from Fig. 8, of two axially spaced, upright U-shaped portions, the spacing of which and the angulate construction of the clip, results in a central, inverted U-shaped portion 75, which serves directly to engage and embrace the periphery of the spider 73. The saddle 74 is by preference constructed of a hard tempered flat stock and may be vulcanized in place at the time of curing the bar 70, or otherwise expressed, may be bonded directly to the rubber or rubber-like stock of the bar. In this construction four apertures are provided in the saddle, those indicated at 76 being in the outer arm portions of the saddle and those indicated at 77 being in the inner arm portions thereof. The openings 76 and 77 being in register, are also in register with a bolt opening 78 provided in the periphery of the spider 73. It is further preferred to bridge, in each of the upright U-shaped parts of the saddle, the zones near the opposite openings 76 and 77, with a cylindrical bushing 79, the bushing being also desirably bonded in place in the rubber-like stock at the time of curing. These bushings 79 are of a suitable internal diameter so as readily to accommodate the attachment bolt 80. It will appear that the bushings 79, by bridging the opposite walls of the saddle, serve to maintain at all times a minimum spacing of the outer and inner saddle portions, and also serve to enhance the holding area of the stock of the bar to its securement means. It will now readily appear that removal or insertion of the attachment bolt 80 and its nut 81 enables ready removal of the bar 70 from the spider and an equally easy replacement. In this case the spider is, similar to the constructions described, welded as shown by fillets 82, to a shaft sleeve 83. The construction of spider 73 may be identical, for example, with the spider 32 heretofore described.

In certain localities particularly characterized by large amounts of gravel or other hard substances in the surface soils, it has been found advantageous to make provision for an even more economical renewal of the threshing elements having direct impact with the grain, grass, beans, peas or the like, than is afforded by even the low-cost bar-forming sections or arms such as 40, 55 and 70.

One such provision consists in a replaceable boot or sleeve adapted to be detachably mounted on and easily removed from the beater arms without the use of special tools, or of any specific attachment means for the boot other than provided by its own construction and shaping in relation to the form of the bars such as 70, for example. One suitable and thoroughly tested type of boot or protective sleeve, is indicated by Fig. 10, wherein the boot, indicated generally at 90, is of tubular form, and by preference although not necessarily, of generally rectangular transverse section. The end portions 91 are of a sectional shape and contouring similar to the overhanging end portions of the bar to which the boot is attached. Intermediate the tubular end portions 91, which are in effect ring-like holding members, one or the inner wall portion of the structure 90 is recessed or cut away as at 92, for the accommodation in assembly of an inner supporting portion of the beater arm or bar, such portion being indicated generally at 93 in Fig. 11 in which the construction of the bar is or may be the same as heretofore described in connection with Fig. 8. The manner of application of the protective boot or sleeve to the bar, and its removal therefrom, is thought to be apparent from the comparison of the solid and dotted lines in Fig. 11. By preference the boot such as 90 is of a fabric and rubber construction, the latter expression where used herein being intended to cover the use of synthetic rubber-like materials as well as natural rubber. The sleeve is also preferably provided with one or two plies of fabric or cords, for strength and wearing resistance.

In application of the boot, one of its end portions is inserted, for example, over the right hand end (Fig. 11) of the bar, and is then stretched lengthwise or axially of the bar, to bring its oppo-

site annular portion over and beyond the opposite end of the bar, the resilience of the boot being such as to permit a degree of stretch sufficient for this mode of application. It will then readily appear that the opposite overhanging end of the bar will be brought to occupy the opposite annular portion 91 of the boot, the cutaway part 92 of the boot serving closely to embrace the depending radial supporting portion 93 of the beater arm. Removal of the boot for replacement purposes is effected by a sequence which is essentially the reverse of that described for application, namely, distention of one of the end portions 91 to bring it endwise beyond the bar end it engages; the boot may then be sleeved off of the opposite end of the bar without difficulty. It will also appear as entirely practicable to utilize the outer wall 94 of the boot 90 as an expedient for augmenting the effective radial distance or height of the beater bars so equipped. This is advisable in some instances where the separator may be employed at times for threshing materials which require a lesser clearance between beaters and concave.

As particularly adapted for the continuing use of a wearing sleeve or boot, a modified bar construction, best shown by Figs. 13 and 14, has been evolved. In this arrangement the spider disc 100 is apertured as at 101, and has its peripheral portion embraced by furcations 102 which may be similar to or identical with the furcations 72 heretofore described. A fastening bolt 103 and a metal saddle or clip 104 completes this portion of the attachment assembly. The threshing bar section or beater is, in this modification, constructed essentially in the form of a loop, one of the sides of the loop being formed by integral resilient arm portions 105. The latter, at their extremities, are turned inwardly at about a right angle, to form a pair of normally aligned elements 106, the two portions 106 collectively constituting the opposite or outer side of the loop. Each of the portions 106, near the zone of their division, is characterized by a depending leg 107, the latter being provided with apertures 108 for the reception of a securement bolt 109, the latter also normally extending through a suitable aperture therefor in an upstanding lug portion 110. In this modification the sleeve, indicated generally at 115, is of tubular form and one-piece construction, being of a fabric and rubber or rubber-like material substantially as described in connection with Fig. 10. According to the arrangement of Figs. 13 and 14 there are however provided in the lowermost or inner wall of the sleeve 115, a row of four openings, two of which are designated at 116, at the ends of the sleeve, and another pair shown at 117, located near the intermediate portion of the sleeve 115. As will appear from Fig. 13, the openings 116 each receives one of the arms 105, and the openings 117 each accommodates one of the downturned legs 107. In this case the internal area of sleeve 115 is somewhat larger than the sectional area of the arms 106, from which it results that, with the bolt 109 removed, the arms 106 may be deflected outwardly at a considerable angle, the ends of the sleeve 115 converged and inserted over the ends of arms 106 and by some minor manipulative movement, the openings 116 brought over arms 105. Then when the sleeve is again restored to rectilinear shape and arms 106 brought into alignment, with the projections 107 through openings 117, the holding bolt 109 may be inserted in the position shown by Fig. 13. Removal of the sleeve 115 for purposes of replacement is effected by a series of steps essentially the reverse of that described for attachment.

The manner of assembly of the individual beater arms or threshing bar sections to its spider to constitute the individual completed unit will have been fully apparent from the foregoing description of parts, in most cases involving merely the use of the attachment bolt such as 80 in Fig. 8, 57 in Fig. 6, and 52 in Figs. 2 and 3. The manner of assembling the adjacent units to built up the cylinder, has been heretofore fully described and will require no further discussion for completeness.

The advantages of the present improvements in use and service are reflected chiefly, as above noted in the objects, in a softer threshing action with markedly less damage to the grain, grass, beans, or other crops being threshed, and in the further advantage that each of the bar sections or beater arms is susceptible, because of its resilience, of deflection or momentary deformation, particularly of the overhanging portions of the arms, thus enabling the threshing elements to pass without damage, stones or other foreign objects finding ther way into the cylinder. In service and in periodic renewal of wearing elements, the present improvements exhibit a marked advantage. Obviously, from the relation and nature of parts described, any individual bar of any of the separate wheel-like units, may be removed and replaced with another, without necessarily disturbing any other bar or unit. Similarly, where desired, each unit may be replaced as a whole. Furthermore, the tremendous advantage in cost, enabled by minimization of mold sizes and hence in cost of curing equipment, will at once be apparent from the relatively small mass and dimensions of the individual beater arms.

Although the invention has been described by making a somewhat detailed reference to but a few of the many possible embodiments, the description is to be regarded as illustrative and not as limiting, because of numerous changes possible within the scope of the claims hereunto appended.

I claim as my invention:

1. In a rotatable threshing cylinder adapted to coact with a concave structure in the separation of grain or the like, a shaft, a bar-supporting structure carried by the shaft, and a plurality of bars mounted on the bar supporting structure, each of the bars being formed of a plurality of substantially aligned resilient sections, each section being relatively short in its dimension axially of the cylinder, and means for individually mounting the bar-forming sections including a pin element secured in assembly to the section, and means coacting with the pin and bar-supporting structure for detachably positioning the pin element and the section by which it is carried, whereby to enable individual removal and application of each of the bar-forming sections.

2. In a rotatable cylinder structure adapted to coact with a concave or the like in the threshing of grain, a plurality of wheel-like units arranged in lateral adjacence in the cylinder, each of said units including a center spider, a plurality of beater arms arranged peripherally of the spider, an anchoring element partly embedded in each of the beater arms, and means for detachably securing the anchoring element to the peripheral portion of the spider, whereby each of the resilient beater arms may be individually removed from or

applied to the spider without affecting the assembly of other arms in the unit or cylinder.

3. In a threshing cylinder assembly, a rotatable bar-type cylinder adapted to coact with a concave in the separation of grain or the like, the cylinder being built up of a plurality of wheel-like units assembled in lateral adjacence, each unit including a plurality of radially mounted, resilient beater arms, and a disc by which the arms are primarily supported, securement means structurally interconnecting each of the beater arms and the disc of its unit, said securement means including a metal element partially embraced by and embedded in the resilient arm by which it is carried, and screw threaded means accessible from a point exteriorly of the arm, for detachable securement thereof to the disc.

4. In a threshing cylinder adapted to coact with a stationary concave in the separation of grain or the like, a plurality of axially adjacent wheel-like units, each of said units including a spider in the central portion of the unit and a plurality of resilient bar-forming sections serving as beater arms, each of said sections being formed of a rubber-like material and characterized by a relatively wider peripheral portion and a relatively narrower securement portion, a metal fastening element embedded in the securement portion of each bar section and projecting therefrom, and screw threaded means coacting with the spider and the projecting portion of said securement element for securement of the element and section to the spider.

5. In a threshing cylinder adapted to coact with a stationary concave in the process of separating grain or the like, a plurality of laterally adjacent wheel-like units coacting to form the body of the cylinder, each of said units including a central spider disc, and a plurality of resilient bar sections formed of a rubber-like stock, the disc being provided with an apertured peripheral portion, and assembly means for connecting each of the bar sections in engagement with an apertured disc portion, said assembly means including a metal element embraced in part by the bar section and projecting therefrom, and means coacting with said projecting portion and the disc for the detachable securement of the bar section thereto.

6. In a threshing cylinder of rotatable type, adapted to coact with a stationary concave, a plurality of axially short, wheel-like units collectively comprising the cylinder body, a plurality of deformably resilient beater arms mounted peripherally and projecting radially of each unit, a spider disc by which the beater arms of each unit are carried, a metal anchoring element affixed to each arm, and a mental holding element interfitting the disc and anchoring element, the disc and anchoring element being formed to embrace the holding element.

7. In a threshing cylinder adapted to coact with a stationary concave in the separation of grain or the like, a plurality of laterally adjacent units of which the cylinder is built up, each unit including a plurality of resilient beaters or threshing arms, and a central spider by which the arms are supported, an anchoring element extended into the body of each arm, and having a furcate portion embracing the perimeter of the spider, and a holding member for detachably assembling the anchoring element to the spider.

8. In a threshing cylinder of a type built up of axially adjacent, separable, coacting units adapted to coact with a stationary concave, each of the units comprising a radially presented series of resilient threshing arms, an anchoring element for each of said arms having a furcate portion extended into the body of the arm, each anchoring element being further shaped and apertured to receive an attachment bolt extended transversely of the spider periphery, and an attachment bolt coacting with the spider and the apertured portion of said element, whereby each said anchoring element and threshing arm are individually removable from and attachable to the spider.

9. In a threshing cylinder adapted to coact with a stationary concave in the separation of grain or the like, a plurality of units assembled near each other along the axis of cylinder rotation and collectively constituting the body of the cylinder, each of said units including a peripheral series of resiliently deformable beater arms, and a central, peripherally apertured spider by which the arms are supported, an anchoring element for each of the arms, said element having a furcate portion extending into the body of the beater arm and the element having an apertured extension exteriorly of the arm, and an attachment bolt coacting with a spider aperture and an aperture of said extension of the anchoring element, for the detachable connection of the anchoring element and associated arm to the spider.

10. In a threshing cylinder of built-up construction adapted to coact with a concave or the like for grain separation, a plurality of units of which the body of the cylinder is built up, each unit including a series of radially presented, peripheral beater arms each of a resilient rubber-like stock, an apertured supporting plate centrally of each unit, detachable fastening means for securement of each of the beater arms to the plate, the fastening means including a furcate metal element having a portion of each furcation embedded in the arm, the element provided with an apertured extension projecting substantially radially inwardly of the arm, and a bolt through corresponding apertures of the extension and the plate.

11. In a threshing cylinder adapted to coact with a stationary concave, a plurality of units each of relatively short axial extent and assembled near each other along the axis of the cylinder and constituting the body thereof, each of said units being characterized by a plurality of spaced peripheral beater arms of a resilient rubber-like stock, an apertured supporting plate constituting the central portion of each unit, a furcate metal anchoring clip formed of flat strip stock, folded upon itself but with its furcations spaced from each other, parts of the furcations, and the bight of the clip being within and substantially embraced by the stock of the arm, and the furcations projecting in substantially parallel relation inwardly of the arm, engaging opposite sides of the periphery of the plate, and being apertured for the reception of a securement bolt, and a bolt engaging the plate and extending through the apertures of the clip for detachable securement thereof to the plate.

12. In a separator cylinder adapted to coact with a concave in the threshing of grain or the like, and built up of a plurality of laterally adjacent sections, the sections each including a spider, a plurality of beater arms carried by the spider, the spider being characterized by angulate seats for the beater arms extending substantially parallel to the axis of rotation of the cylinder, a headed bolt having its head substantially embedded in

each of the arms and projecting radially and inwardly thereof, each of said spider seats being provided with a bolt aperture, and a bolt and nut thereon coacting with the seat for detachably securing the arm thereto.

13. In a threshing cylinder, a cylinder body built up of a plurality of laterally adjacent sections adapted to coact with a stationary concave, each of said sections including a peripherally apertured central mounting element or spider, a radial series of arms arranged peripherally of the spider and each forming a section of a threshing bar, each of the arms including an outer bar-forming portion and a securement portion furcated to receive a portion of the periphery of the spider, and a securing pin through the furcations of the securement portion of the arm, and extending through one of the apertures of the spider, for assembly of the arm to the spider.

14. The combination and arrangement of elements as recited in claim 13, characterized by the addition of a metal clip in the form of a saddle of angulate section, said saddle embracing opposite sides of each of the furcations of the securement portion of the arm, and further embracing the portion of the spider periphery between the furcations of the arm, the clip or saddle structure being apertured to receive the securing pin.

15. In a bar-type threshing cylinder, a plurality of laterally adjacent threshing units constituting a built-up cylinder body adapted to coact with a stationary concave or the like in the separation of grain, each of said units including a metal spider, a series of radially presented, peripherally spaced threshing arms on each spider, each of said arms having a relatively narrow securement portion and a somewhat wider peripheral portion constituting a bar section of the threshing portion of the cylinder, the securement portion of each of the threshing arms being furcated to receive a peripheral portion of the spider, a metal saddle of substantially angulate form having a central inverted U-shaped portion overlying a peripheral part of the spider, and a pair of oppositely presented U-shaped portions, each seated upon one of the furcations of the threshing arm, the spider being peripherally embraced by the saddle, and the functions of the arm being apertured to receive a securement bolt, a securement bolt extended through said apertures, and a spacing element bridging the opposite side walls of each of the furcations of the threshing arm, and the corresponding wall portions of the saddle.

16. In a rotatable threshing cylinder adapted to coact with a concave structure in the separation of grain or the like, a shaft, a bar-supporting structure carried by the shaft and including a plurality of spiders disposed in parallel relation to one another, a plurality of bars mounted on the bar supporting structure and each formed of a plurality of substantially aligned resilient sections, each section being relatively short in its dimension axially of the cylinder and being secured to the periphery of one of the spiders, and means for holding the spiders in fixed spaced relation on the shaft to prevent axial shifting of the spiders and thereby avoid axial compression of said resilient sections of the bars.

17. In a rotatable threshing cylinder adapted to coact with a concave structure in the separation of grain or the like, a shaft, a bar-supporting structure carried by the shaft and including a plurality of spiders disposed in parallel relation to one another, a plurality of bars mounted on the bar supporting structure and each formed of a plurality of substantially aligned resilient sections, each section being relatively short in its dimension axially of the cylinder and being secured to the periphery of one of the spiders, and means disposed between the shaft and the bars and connecting adjacent spiders to prevent relative rotation of the spiders on the shaft.

18. In a rotatable threshing cylinder adapted to coact with a concave structure in the separation of grain or the like, a shaft, a bar-supporting structure carried by the shaft and including a plurality of spiders disposed in parallel relation to one another, a plurality of bars mounted on the bar supporting structure and each formed of a plurality of substantially aligned resilient sections, each section being relatively short in its dimension axially of the cylinder and being secured to the periphery of one of the spiders, means for holding the spiders in fixed spaced relation on the shaft to prevent axial shifting of the spiders and thereby avoid axial compression of said resilient sections of the bars, and means disposed between the shaft and the bars and connecting adjacent spiders to prevent relative rotation of the spiders on the shaft.

19. In a grain thresher or the like having a concave structure, a cylinder assembly comprising a plurality of relatively short resilient and deformable beater elements disposed in end to end relation, and means mounting said elements for rotation in unison about an axis extending through the concave structure, said means including a shaft and a plurality of spiders on the shaft, the spiders being disposed in end to end abutting relation to locate the beater elements carried thereby in predetermined relation to one another.

20. In a grain thresher or the like having a concave structure, a cylinder assembly comprising a plurality of relatively short resilient and deformable beater elements disposed in end to end relation, and means mounting said elements for rotation in unison about an axis extending through the concave structure, said means including a shaft and a plurality of spiders on the shaft, the spiders being disposed in end to end abutting relation to locate the beater elements carried thereby in predetermined relation to one another, end members on the shaft, and rods extending between the end members to hold the latter against the endmost spiders.

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