

Jan. 30, 1968

C. S. PHILLIPS

3,365,867

VARIED SPACING ROW CROP HARVESTER

Filed April 19, 1965

3 Sheets-Sheet 1

Fig. 2.

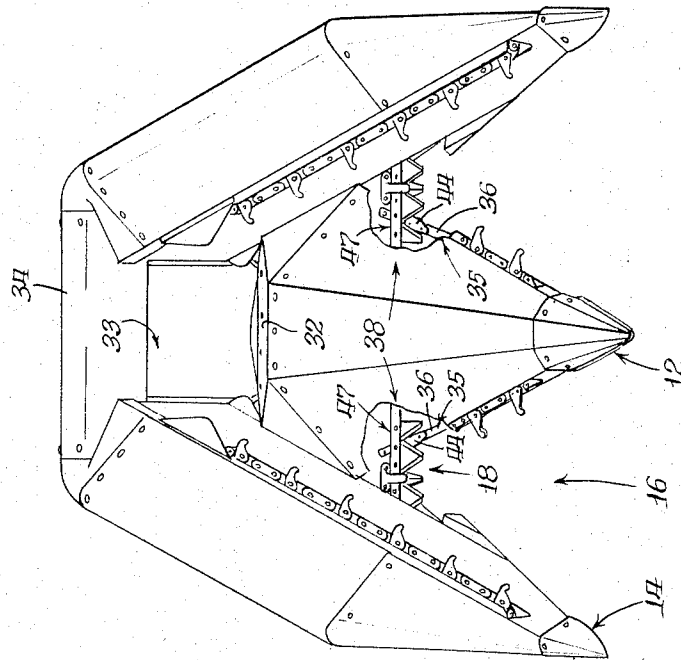
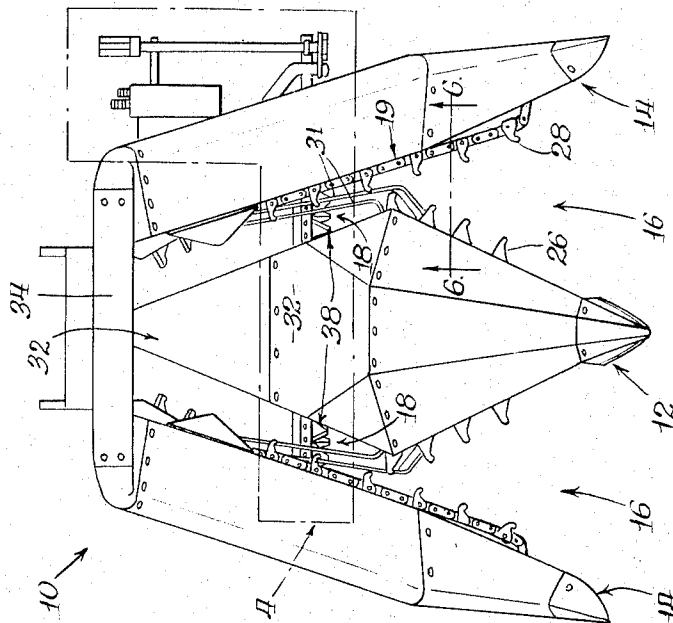


Fig. 1.



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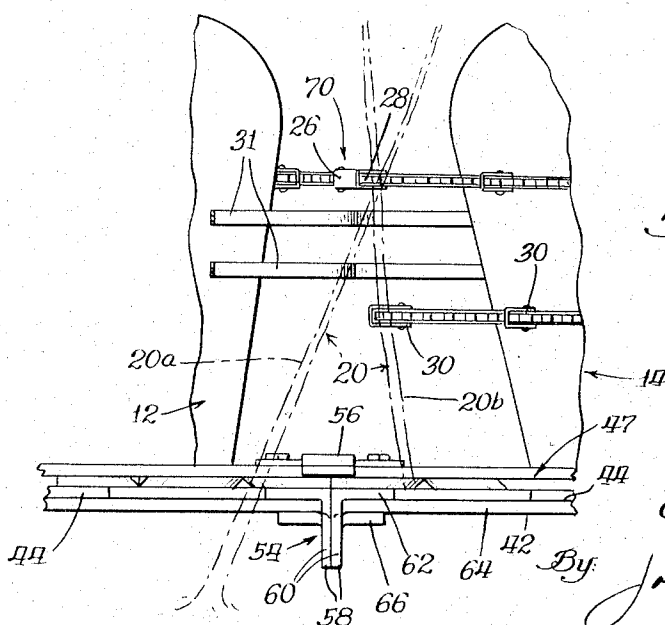
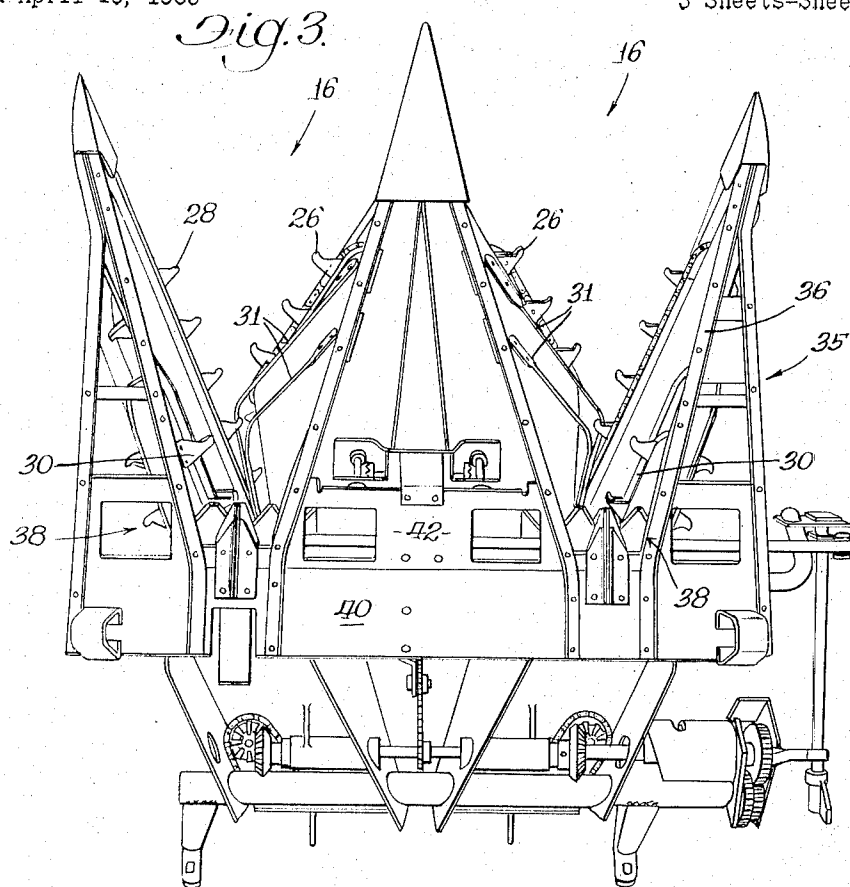
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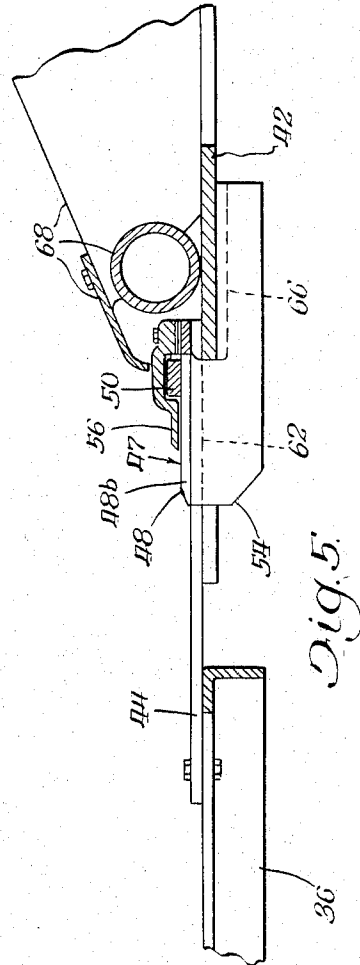
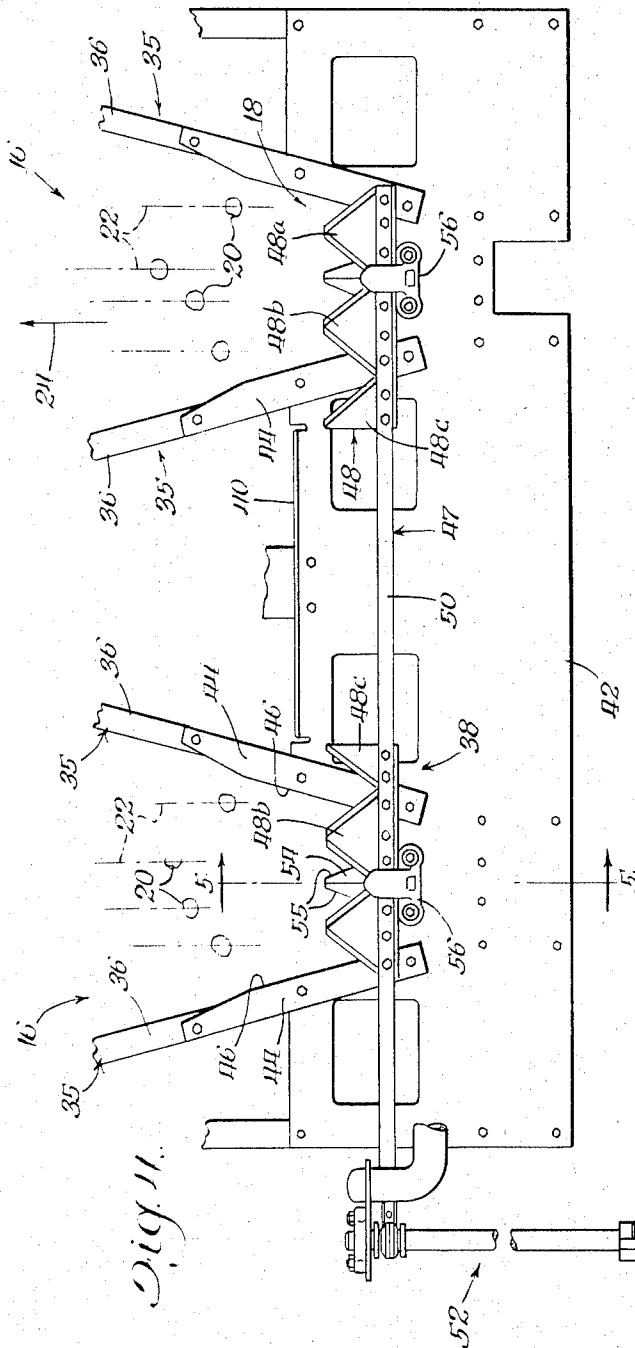
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VARIED SPACING ROW CROP HARVESTER

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3 Sheets-Sheet 3



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3,365,867
VARIED SPACING ROW CROP HARVESTER
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ABSTRACT OF THE DISCLOSURE

A row crop harvester having plant gathering passages converging generally rearwardly and each passage terminating in a throat, a reciprocating sickle and knives at opposite sides of each throat, each passage being wide at its lower portion to accommodate various row spacings and having a constriction at its upper portion intermediate its ends to bend the stalks laterally onto a table intermediate the passages.

The present invention relates to a varied spacing row-crop harvester.

Crop rows are not uniformly spaced apart and a harvester designed for harvesting rows at a certain spacing is not fully effective for harvesting rows at other spacings. Crop rows may vary widely, between for example 28" and 42" spacing, or more. Difficulties encountered in accommodating row spacings such as that indicated are substantial, and the problems are more serious in the case of cutting stalks adjacent the ground as contrasted with, for example, picking corn where the ears are at a substantial distance above the ground and the stalks can be easily bent into the desired position for picking the ears.

Heretofore the most common manner of overcoming the difficulties indicated was to make the harvester adjustable for accommodating rows of different spacings. Such an adjustable harvester is, as generally known, expensive and complicated.

A broad object of the present invention is to provide a harvester of fixed construction, i.e., having units of fixed spacing apart, but capable of accommodating rows of different spacings. Such rows are accommodated not only without adjustment, but without replacement or interchanging of any of the parts or elements of the harvester.

A more specific object is to provide a row crop harvester of the type for cutting plant stalks having novel construction including plant gathering passages converging generally rearwardly and terminating in throats where the stalks are cut, and wherein the throats are of substantial width to facilitate accommodating stalks in various positions in the ground representing rows of different spacings.

Still another specific object is to provide a harvester of the character just referred to wherein the cutting means includes a sickle operating transversely in the throat whereby to produce effective cutting action throughout the width of the throat regardless of the position of the stalk.

Still another object is to provide a harvester of the character just referred to wherein edge knives are provided on the sides of the stalk gathering passages adjacent the throats, and in cooperation with which the sickles operate in their cutting action.

A further object is to provide a harvester of the foregoing character having stalk receiving passages terminating rearwardly in throats where the stalks are cut, and wherein cutting means are provided at the throats which include transversely operating sickles and knives on the side edges of the passages, and wherein a novel arrangement is provided for constantly keeping the passages and throats clear of stalks and pieces thereof against the

tendencies to accumulate due to the characteristic construction of multiple row harvesters.

Still another object is to provide novel means for cutting stalks particularly adapted to general constructions of harvesters which are provided with gathering chains in the stalk gathering passages and pressure means cooperable with the gathering chains for confining the stalks in the cutting operation.

Other objects and advantages of the invention will appear from the following detailed description taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is an elevational view from the front and from a slightly elevated viewpoint, of a row crop harvester embodying the features of the present invention;

FIGURE 2 is a view similar to FIGURE 1 but from a lower viewpoint, on a slightly different scale, and having portions broken away;

FIGURE 3 is a perspective view of the under side of the harvester and on a slightly different scale from FIGURES 1 and 2;

FIGURE 4 is a top view of a sub-assembly including the cutter means embodying the features of the invention, and contained in the dot-dash outline 4 of FIGURE 1, but in reverse position;

FIGURE 5 is a sectional view taken at line 5—5 of FIGURE 4 and on an enlarged scale; and

FIGURE 6 is a view taken at line 6—6 of FIGURE 1.

Referring now in detail to the drawings, attention is directed first to FIGURES 1, 2 and 3 showing a harvester as a whole including an overall construction similar to harvesters heretofore known. The harvester indicated in its entirety at 10 includes a center gathering point 12 and side gathering dividers 14 defining plant receiving or gathering passages 16 each terminating rearwardly in a throat 18 of substantial width. The passages 16 converge generally rearwardly in their lower portions, gathering the stalks therein and generally confining them progressively as they approach the throats. The upper portions also diverge rearwardly from their front ends to points 19 in front of and narrower than the throats, and then continue in nearly uniform width to the rear of the machine. This arrangement in shape will be referred to again hereinafter. FIGURE 4 shows a number of plants 20, which may be corn stalks, cane stalks, sorghum, etc., indicated diagrammatically and each in a separate row represented by dot-dash line 22, these rows of course extending in the direction of travel of the harvester, which is away from the observer in FIGURE 4 as indicated by the arrow 24. The plants 20 may represent nominal row spacings as between mated plants in the two passages 16, or they may represent random and accidental lateral spacing between successive plants in a single nominal row. In any case, each throat 18 will accommodate substantial lateral spacing between plants in the passages, and a minimum of 7" so that both together will accommodate variations of 14" in spacing between nominal rows in the example given, namely, 28" to 42". Obviously the invention is not limited to these specific dimensions.

The harvester includes gathering chains in the passages 16, those chains in each passage including an inner chain 26 on the inner side of the passage and an outer chain 28 on the outer side of the passage, arranged and functioning in the usual manner. Below the outer chain 28 is a butt chain 30 (FIGURE 3). Mounted in each passage also are pressure straps 31 secured at their front ends to the center gathering point 12, and having their rear ends loose and detached and extending rearwardly in the passage beyond the throat 18. These pressure straps cooperate with the gathering chain 28 and the butt chain 30 in confining the plant stalks against those two chains and aiding the confinement of the stalks in carrying them rear-

wardly in the passage. It will be understood that the movement of the stalks referred to is relative to the harvester moving forward. The inner gathering chain 26 does not extend rearwardly as far as the chains 28 and 30, the pressure straps serving to control the stalks after the latter pass beyond the chain 26.

The center gathering point 12 terminates rearwardly in a table 32 at the rear end of which is an exit opening 33, the latter being defined at the sides by the main side portions of the harvester which extend rearwardly from the side gathering dividers 14, and at the top by a prostrating shield 34. As the stalks are received in the passages 16, the chains 26, 28 and 30 together with the pressure straps 31 carry the stalks rearwardly, and after the stalks are cut and they engage the prostrating shield 34, the upper portions thereof are restrained from further rearward movement and the lower butt ends are then forced out of the exit of opening where they are handled in the usual manner. Since the butt chains 30 run faster than the top chains 26 and 28, the stalks are advanced into the chopping mechanism butt ends first. That is, the stalks are laid on table 32 with the butt ends to the rear.

The harvester includes a frame structure indicated in its entirety at 35 having various structural elements, braces, etc. The frame includes in the case of each gathering passage 16 a pair of elements 36, which may be angle irons and extend respectively from the foremost ends of the center gathering point 12 and side gathering dividers 14. These elements 36 define the lower extremity of the passage 16, and converge rearwardly as noted above, and specifically define the throat 18 where the plant stalks are cut. The cutting means of the invention indicated in its entirety at 38, is shown generally in FIGURES 1, 2 and 3 and details of it are shown in FIGURES 4, 5 and 6.

The frame 35 of the harvester includes a skirt or flange 40 (FIGURES 3 and 4) to which the rear ends of the frame elements 36 may be secured. Leading forwardly from this skirt or flange is another frame element 42 which, in the operative position or the harvester, is adjacent the horizontal. Portions of the cutter means 38 are mounted on this frame element 42.

The cutting means 38 in the two passages 16 are similar but opposite and symmetrical, similarly to other duplicated parts of the harvester. Secured to each frame element 36 is an edge knife 44 at the rear end of the passage and extending into and beyond the throat 18. Each edge knife has a cutting edge 46, the cutting edges of the two knives in each throat being opposed and facing each other. Preferably the edge knives 44 converge rearwardly generally along the lines of convergence of the frame elements 36, but it is within the broad scope of the invention to provide parallel edge knives.

The cutter means 38 include a sickle 47 having a portion 48 in each throat, each portion being made up of a plurality of (preferably two) full sections 48a and 48b and a half section 48c. The sickle sections are mounted on a common bar 50 in the usual manner, the bar being reciprocated by driving means 52 of known kind and operated in a known manner from the drive of the machine.

The sickle rides on the edge knives 44 and on ledger dividers 54, one ledger divider being disposed in each throat 18 substantially midway between the edge knives. The sickle is held down by hold down clips 56 of known kind.

A suitable construction of the ledger divider 54 will be seen in FIGURES 5 and 6. This member is made up of a pair of symmetrical elements 58, having depending legs 60 butted together in a central vertical fore-and-aft plane. Each element has a turned over leg 62 fitted over an adjacent element 64 of the frame member 42, and another turned over element 66 under the element 64. The elements 60 may be welded together for example and the elements 62 and 66 secured to the frame elements 64 as

desired. Other structural elements 68 (FIGURE 5) may be provided as desired.

From FIGURES 5 and 6 it will be seen that the upper surfaces of the ledger dividers 54 and the edge knives 44 lie in a common plane over which the sickle rides. Preferably the frame elements 35 terminate rearwardly slightly short of the throat 18 whereby the edge knives 44 serve as the sole means at that location reacting against and cooperating with the sickle in the cutting operation. The ledger dividers have outwardly directed cutting edges 55 against which the sickle also works.

The sickle 47 reciprocates in a straight line transversely of the machine and operates in the same sense or direction on all of the plant stalks 20 passing through the passage 16, and thereby produces the same effective cutting action on all of the stalks regardless where they are disposed in the throat of the passage, transversely thereof. The throat is of substantial width and can accommodate a wide variation of plant rows with full effectiveness in cutting any of the stalks within that range. In the cutting action the full sickle sections 48a and 48b work against the edge knives 44 and the ledger divider 54, producing a full and effective cutting action throughout the range of reciprocation of the sickle and the corresponding width of the throat. The half section 48c works against the rear of the adjacent edge knife 44 for assisting in maintaining the throat clear of stalks or pieces thereof that tend to accumulate in the area. Due to the characteristics of a multiple row harvester, stalks and pieces thereof tend to accumulate in the "island" or the center gathering point 12, and the half sickle sections 48c, being disposed inwardly of the passages, as they are, and working against the inner edges of the corresponding edge knives, prevent such accumulation.

The spacing of the edge knives 44 and ledger dividers 54 transversely of the throat provide effective means, with the sickle, for cutting all of the stalks uniformly regardless where the stalks are located in the throat.

An important feature of the invention is that the harvester accommodates widely varied row spacing while the gathering chains remain at close proximity to each other and at a fixed position. For example at the point 19 the portions of the center gathering point 12 and side gathering divider 14 are closely proximate and they are of course fixed. The gathering chains 26 and 28 are also closely proximate to each other and actually overlap or intermesh as shown at 70 in FIGURE 6.

In cutting stalks 20 in narrow rows they bear against the center gathering point 12, and the upper portions are deflected outwardly as indicated by the position of the stalk 20a, which is bent outwardly into engagement with the outer gathering chain 28. After passing beyond the inner gathering chain 26 the stalks engage the pressure straps 32 which continue to retain the stalks in effective engagement with the outer gathering chain 28, and when the stalks are cut, the lower ends are then moved outwardly, by the pressure straps 32, into engagement with the lower butt chain 30 which carries the lower ends rearwardly, and the two chains 28 and 30 then function to carry the stalks rearwardly and out of the machine in the regular manner.

The different spacings of the plant rows are effectively accommodated in the harvester of the present invention which is fixed in all respects with reference to lateral spacing, there being no need for lateral adjustment, nor in fact can there be any such adjustment. Additionally, the harvester of the invention is effective for the purpose stated without the necessity for replacement or interchanging any of the elements or parts of the harvester.

While I have disclosed herein a preferred form of the invention it will be understood that changes may be made within the scope of the appended claims.

I claim:

1. A harvester of the character disclosed comprising in combination, a center gathering point and side gathering

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dividers defining a pair of fore-and-aft plant receiving passages each having a lower portion converging rearwardly and terminating in a throat, each passage also having an upper portion intermediate the ends of the passage constituting a constriction relative to that portion of the passage therebelow, cutter means in said throat including knives at each side of each passage for cutting stalks of plants passing through the passage, and means at the upper portion of the passages and including said constriction for confining stalks of plants passing through the rear portion of the passages beyond said constriction, within transverse limits similar to the corresponding limits of the constriction.

2. The invention set out in claim 1 wherein said constriction is of lesser transverse dimension than the throat.

3. A harvester of the character disclosed comprising in combination a center gathering point and side gathering dividers defining a pair of fore-and-aft plant receiving passages each having a lower portion converging rearwardly and terminating in a throat, each passage also having an upper portion intermediate the ends of the passage constituting a constriction relative to that portion of the passage therebelow, cutter means in said throat including side knives on said dividers and point for cutting stalks of plants passing through the passage, and means at the upper portion of the passages and including said constriction for confining stalks of plants through the rear portion of the passages beyond said constriction, within transverse limits similar to the corresponding limits of the constriction, said means for confining the upper portions of the stalks including a gathering chain at least on the outer side of the passage which continues rearwardly beyond said throat, and pressure straps on each inner side of the passage biasing the stalks outwardly into confining engagement with the gathering chain.

4. A harvester of the character disclosed comprising, in combination, a center gathering point and a pair of side gathering dividers defining fore-and-aft plant receiving passages, each passage having a lower portion converging generally rearwardly and terminating in a throat, each passage having an upper portion converging rearwardly from the forward end to a point intermediate the ends of the passage where the passage is constricted to a spacing substantially less than the transverse width of the throat, means for cutting stalks at said throat in the lower portion of the passage including side knives at opposite side of the passage, gathering chains including an inner chain on the center gathering point leading from adjacent the forward end of the point and terminating rearwardly adjacent said constriction, and including an outer chain leading from adjacent the forward end of the corresponding side gathering divider to a point beyond said constriction and said throat, and pressure straps secured at one end to the center gathering point adjacent said constriction and leading rearwardly where their rear extended ends are separate and detached from the remainder of the machine and are operative for biasing the upper portions of plant stalks in the passage outwardly into confining engagement with the outer gathering chain.

5. The invention set out in claim 4 in which a butt chain is provided in each passage on the outer side there-

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of below said gathering chain thereon and has a range of movement from a point ahead of the throat to a point rearwardly of the throat, and said pressure straps are operative, after the stalks are cut, for biasing the lower ends of the stalks into confining engagement with both the outer gathering chain and the butt chain.

6. A harvester of the character disclosed comprising, in combination, a center gathering point and a pair of side gathering dividers defining fore-and-aft plant receiving passages, each passage having an inner side defined by the center gathering point and an outer side defined by the respective side gathering divider, and each passage having a lower portion converging rearwardly and terminating in a throat of substantial width, a pair of edge knives mounted in a passage adjacent the throat having inner cutting edges directed toward each other, a ledger divider in each passage at the throat between the edge knives and having side cutting edges respectively directed generally toward the cutting edges of the associated edge knives, sickle means in the passages reciprocable transversely thereof and having sections working against said ledger divider and edge knives, and each sickle means including a sickle section reciprocable beyond the inner side of the passage and having a cutting edge working against the rear side of that edge knife, each passage also having an upper portion converging rearwardly from the forward end thereof to a constriction intermediate its ends of substantially less transverse dimension than said throat, gathering chains in each passage including an inner chain on the center gathering point leading from adjacent the forward end thereof to adjacent said constriction and including an outer chain on the respective side gathering divider leading from adjacent the forward end of the passage rearwardly substantially beyond said constriction and throat, and a butt chain in each passage mounted on the corresponding side gathering divider below the outer gathering chain leading from a point forwardly of the constriction to a point rearwardly of the throat, and pressure straps on the inner side of each passage having their forward ends secured to the center gathering point and their rear ends separate and detached of connection with the remainder of the machine and projecting rearwardly beyond the throat, said pressure straps being self-biased outwardly and operative for biasing the upper portions of the plant stalks passing through the passage outwardly into engagement with the outer side of the passage, and into confining engagement at least with the outer gathering chain in that passage, and after the stalks are cut, biasing the lower portions of the stalks outwardly into engagement also with the butt chain.

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