W. W. & S. E. MORRAL.

CORN HUSKING MACHINE.

APPLICATION FILED JUNE 21, 1911.

1,121,937.

Patented Dec. 22, 1914

4 SHEETS—SHEET 1.

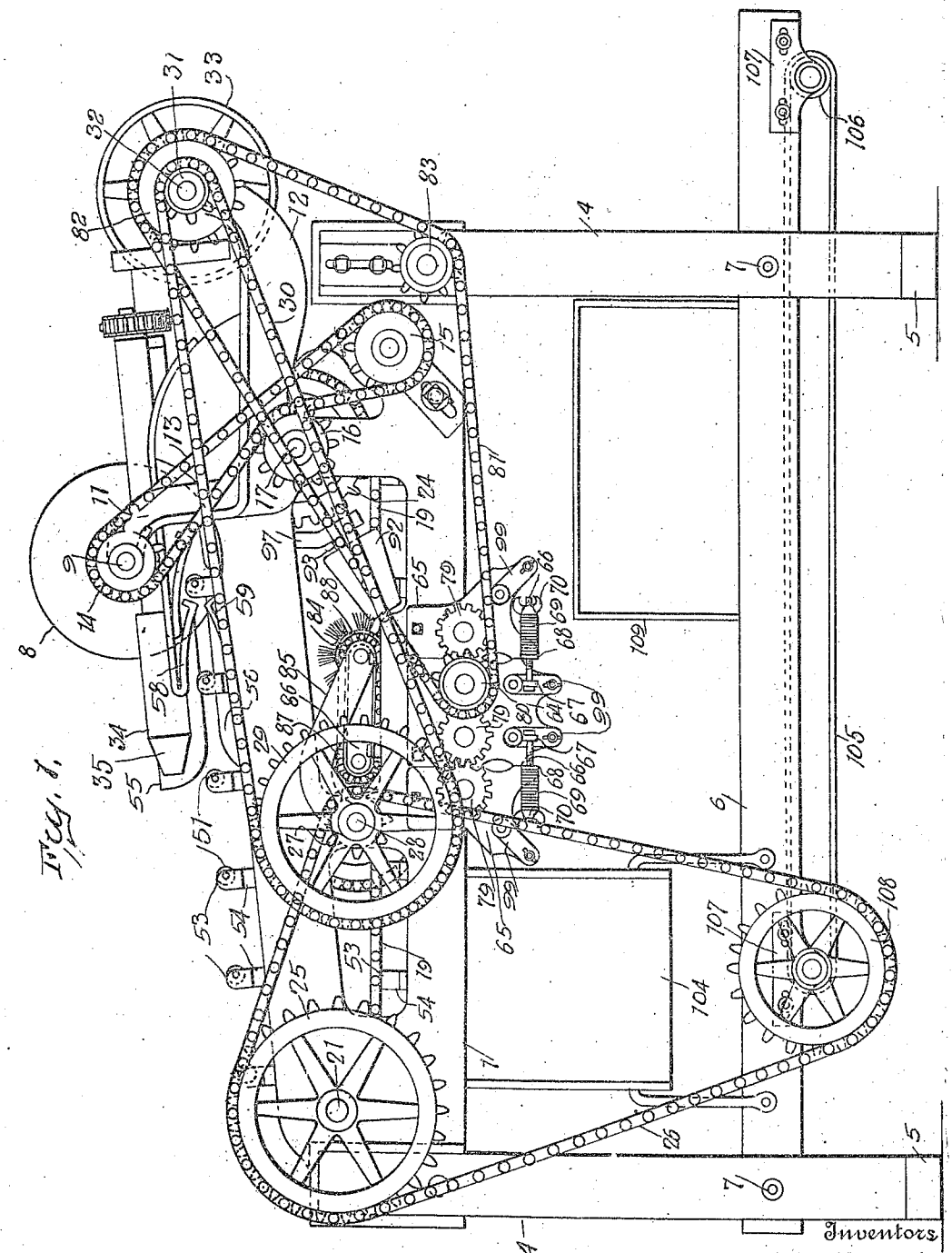


Fig. 1.

Witnesses

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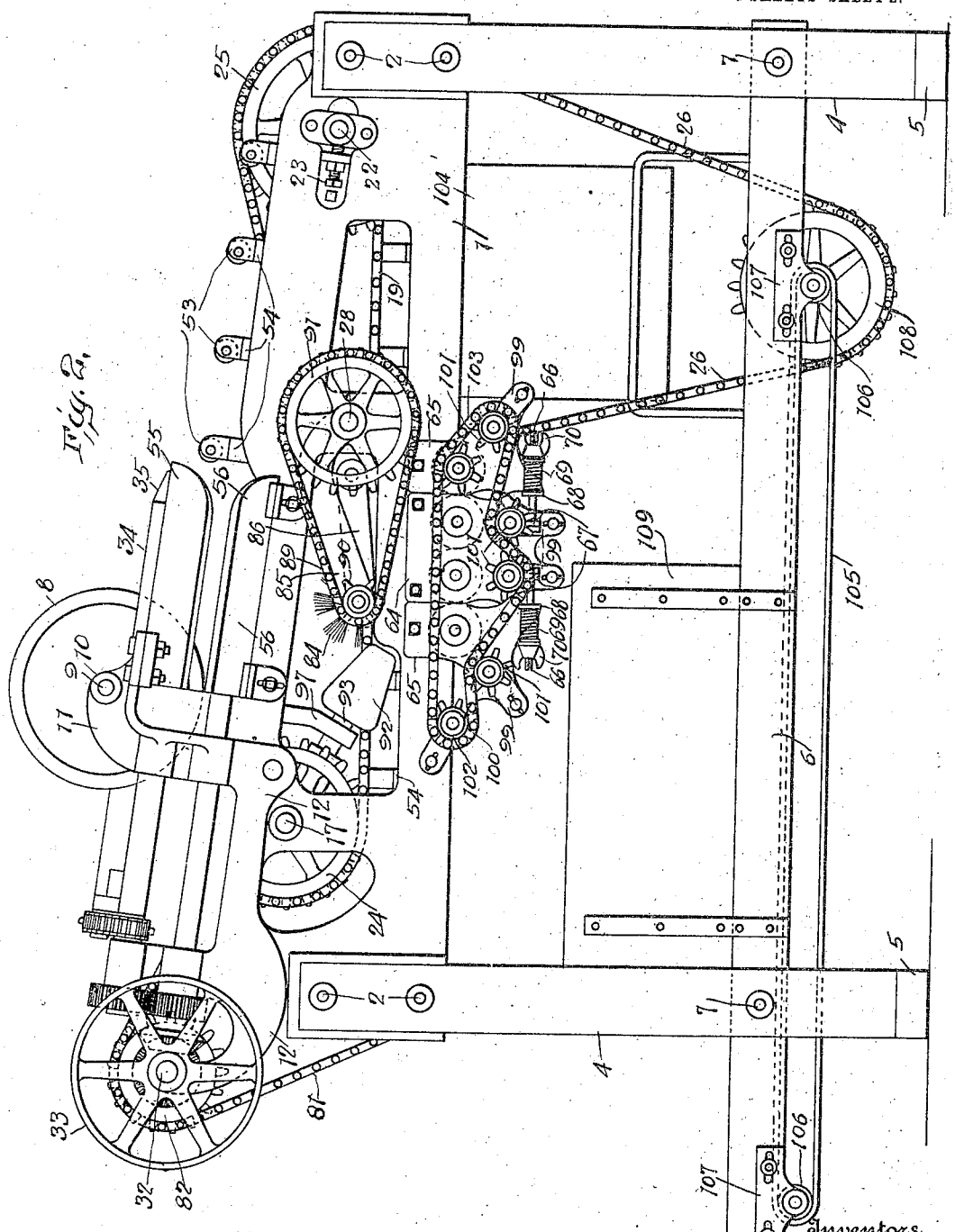
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

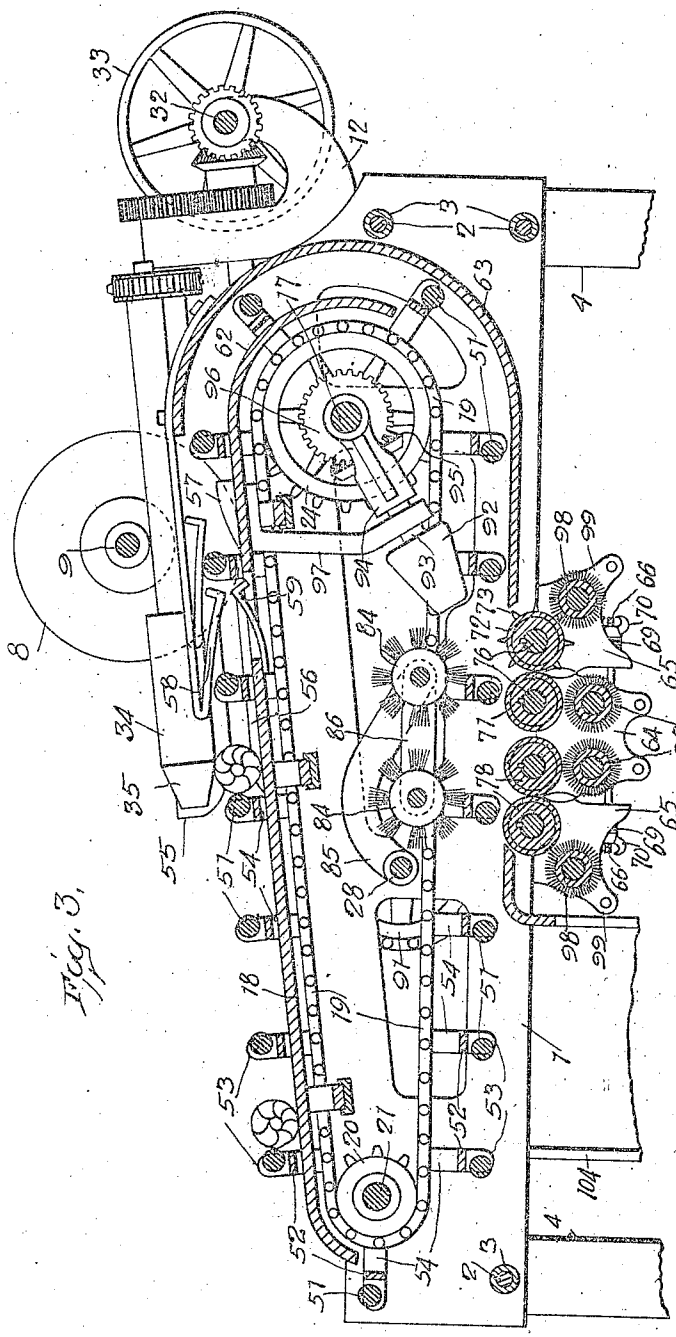


Fig. 3.

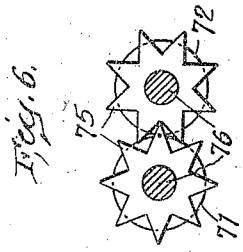


Fig. 6.

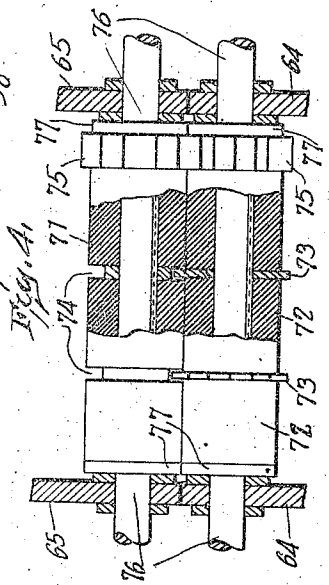


Fig. 4.

Witnesses

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4 SHEETS—SHEET 4.

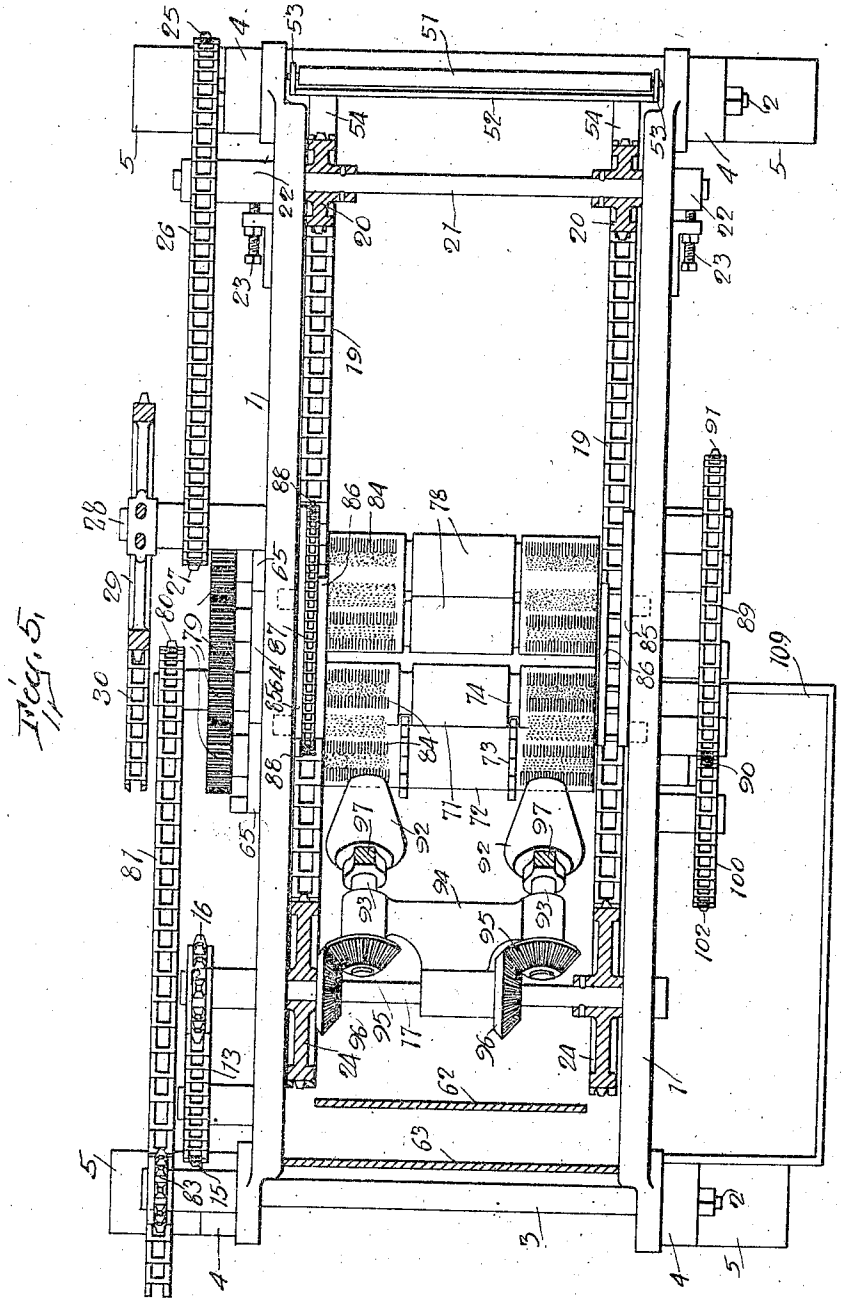


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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CORN-HUSKING MACHINE.

1,121,937. Specification of Letters Patent. Patented Dec. 22, 1914.

Application filed June 21, 1911. Serial No. 634,567.

To all whom it may concern:

Be it known that we, WILLIAM W. MORRAL and SAMUEL E. MORRAL, citizens of the United States, residing at Morral, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Corn-Husking Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to corn husking machines and is a division of the application filed by us Dec. 23, 1909, Ser. No. 534,583.

The object of the invention is to provide a single machine of a compact arrangement which will receive an ear of green corn as it comes from the stalk, sever the butt therefrom, remove the husk and silk and deliver the ear in a condition to go to the cutting machine.

To this end it is a further object of the invention to provide in combination with a butt-removing mechanism a husking mechanism connected with the butt-removing mechanism by suitable feeding devices which will convey the ear of corn to the husking mechanism and present the same thereto in a position to be properly acted upon thereby; to provide the husking mechanism with husk-loosening devices and means for properly positioning the ear to cause it to be engaged by said husk-loosening devices; to provide means which will effectually hold the ear in engagement with the husking roller and rotate the same during the husking operation without bruising the grains or otherwise injuring the corn; and further, to so improve the construction of the husking mechanism as to more effectually remove the husks from the green corn without injuring the corn.

In the accompanying drawings, Figure 1 is a side elevation of a combined butt-removing and husking machine embodying our invention; Fig. 2 is a side elevation of that side of the machine opposite the side shown in Fig. 1; Fig. 3 is a vertical longitudinal, sectional view taken through the upper portion of such a machine; Fig. 4 is a detail plan view of the husking rollers; Fig. 5 is a horizontal, sectional view, taken just below the supporting table of Fig. 3; and Fig. 6 is an end elevation of the rollers shown in Fig. 4.

In these drawings we have illustrated one embodiment of our invention and have shown the same as comprising a main frame consisting of side members 1 connected one to the other by transverse bolts or bars 2 having mounted thereon spacing sleeves 3, which sleeves are arranged between the side members 1. This main frame is supported by standards or legs 4 which are secured to the respective side members 1 by means of the bolts 2 and are mounted at their lower ends upon supporting blocks or transversely extending bases 5 which serve to tie together the legs of each pair, that is, the two legs at each end of the machine. Longitudinally extending side members or bars 6 are secured to the legs on the respective sides of the machine by means of bolts 7 and serve both to connect together the legs on the same side of the machine and to form a support for certain parts of the mechanism to be hereinafter described.

Butt-removing mechanism of a suitable character is preferably mounted on the upper portion of the main frame between the ends thereof. This mechanism, as here shown, comprises a rotary cutter 8 mounted on a shaft 9 extending transversely to the main frame and journaled in bearings 10. A suitable supporting table or bed plate 18 is arranged with one edge adjacent to the cutter and the ears of corn are fed over this bed plate toward the cutter by suitable feeding mechanism which, in the present construction, comprises an endless carrier consisting of two sprocket chains 19 arranged on opposite sides of the supporting table and extending about sprocket wheels 20 carried by a shaft 21 journaled in the main frame near one end of the supporting table and other sprocket wheels 24 mounted on a shaft 17 arranged near the other end of the supporting table. This feeding mechanism may be driven in any suitable manner but we have here shown the shaft 21 as having secured thereto a sprocket wheel 25 about which extends a sprocket chain 26 which also extends about a sprocket wheel 27 on a stud shaft 28 to which motion is imparted by means of a second sprocket wheel 29 about which extends a sprocket chain 30 which also extends about a sprocket wheel 31 on a driving shaft 32 journaled in suitable bearings on the main frame and to which power may be applied in any suitable manner, as by means of a belt wheel 33. Suitable ear engaging devices are secured to

the sprocket chains at intervals and are arranged to extend above the supporting table and at substantially right angles to the line of movement of the ear of corn. Preferably these ear engaging devices are in the form of rollers 51, the ends of which are rotatably mounted in brackets which are here shown as comprising transverse bars 52 having upturned ends 53 in which the rollers are journaled. These brackets are connected at their opposite ends to the respective chains by means of arms 54. The length of the arms is such that the transverse bars or brackets and the rollers will be supported such a distance above the supporting table as to cause the roller to engage the ear at the proper distance from the table. Preferably the roller is so mounted in brackets that the forward portion thereof will extend beyond the adjacent edge of the transverse bar 53. Thus only the roller will engage the ear.

Means are provided for moving the ear of corn transversely to the supporting table and into a position to be engaged by the rotary cutter. This means is here shown as comprising a roller 34 extending longitudinally to the table and so arranged as to engage the upper surface of the ear and positively move the same toward that side of the supporting table adjacent to the cutter 8. The lateral movement of the ear is limited by a guide and is here shown as comprising two plates 55 and 56 spaced apart a distance sufficient to permit the stem of the ear to pass between them but to engage the butt and thus check the lateral movement of the ear.

Means are provided to overcome the tendency of the ear to move relatively to the ear engaging member of the feeding mechanism when the butt is engaged by the cutter. To this end shearer bars, one of which is indicated at 51, are arranged to engage the ear near the butt and support the same during the cutting operation, and suitable resilient resisting devices, such as forwardly converging springs 58 and 59, are provided to engage the tip of the ear and resist its forward movement.

The husking mechanism is located at a point beyond the butt-removing mechanism and is arranged to act upon the ear of corn after the butt has been removed therefrom. In the present instance we have shown the corn husking mechanism as supported from the main frame at a point beneath the butt-removing mechanism. We have also shown a chute or guide-way leading from the butt-removing devices to the husking devices, and mechanism for positively moving an ear of corn through the chute and delivering the same to the husking mechanism. This chute is preferably formed by curving the rear end of the bed-plate 18 downwardly, as shown at 62, and arranging a curved guide plate 63 at a point sufficiently removed from the curved end 62 of the bed-plate to permit the ear of corn to pass between the two plates. In the present instance this curved plate extends from a point immediately in the rear of the rotary cutter, about the end of the feed belt where it passes over the sprocket wheel 24 and to the husking mechanism. The lower portion of the plate, that is, the portion adjacent to the husking mechanism, is preferably horizontal, as shown in Fig. 3. The feed mechanism for positively moving the ear of corn through this chute is, in the present instance, the same feed belt that conveys the ear of corn to the butt-removing devices, the chute being so arranged that the feed rollers 51 pass through the chute and convey the corn to the husking mechanism. Obviously, if the ear of corn were carried to a point beyond the butt-removing device and discharged into the chute it would pass through the same by gravity, but, in doing so it would twist and turn until, when it reached the lower end of the chute and was ready to be delivered to the husking mechanism, it would be liable to occupy a position such that the husking mechanism would not properly act on the same. By employing the positive feed mechanism this difficulty is overcome. Of course, after the ear of corn has passed into the chute it will drop away from the feed roller which has been conveying it and will move through the chute by gravity, but this movement is limited by the next preceding feed roller and the space between the two rollers is such that the ear will not turn or twist to any material extent in passing from one to the other. The ear will follow the preceding feed roller through the chute until it reaches the lower extremity of the curved portion of the chute, at which point the ear will cease to move by gravity and will come to a stop until it is engaged by the feed roller which follows it. This roller will move the ear along the flat portion of the chute and will cause the same to assume a position substantially parallel with the feed roller, in which position it is delivered to the husking mechanism and is properly acted upon to move the husk therefrom.

The husking mechanism, as here shown, consists of a plurality of pairs of husking rollers, the rollers of each pair being rotated in opposite directions so that they will pinch the husk between them and pull it from the ear. In the present construction we have employed two pairs of these rollers or four rollers in all. The two central rollers, or the inner roller of each pair, are journaled in plates 64 which are rigidly secured to and depend from the two side members of the main frame. The outermost rollers are journaled in plates 65 which are piv-

otally connected at their upper ends to the opposite side members of the main frame and are resiliently connected at their lower ends to the plate 64, this connection preferably comprising, in each instance, a bolt 66 extending through a lug 67 on the plate 64 and through a corresponding lug 68 on the pivoted plate 65. A spring 69 is coiled about the bolt 66 and confined between the lug 68 and a nut 70. The tension of the spring tends to hold the outermost roller of each pair in contact with the innermost roller of the corresponding pair, but permits the rollers to move apart sufficiently to allow the husks to pass between the same. In this manner we secure a strong gripping action by the rollers without liability of choking the rollers with husks.

The husking rollers may, of course, be of any suitable construction, but, in the construction here shown, they are made up of a plurality of sections or cylinders of iron covered with rubber. The first pair of rollers, comprising the individual rollers 71 and 72, are provided with special means for loosening the husk on the ear. To this end the sections of iron and rubber of the roller 72 are spaced apart and have arranged between them toothed disks or star wheels 73, while the sections of the roller 71 are divided at points in alinement with the toothed disks 73 by narrow disks which form grooves 74 adapted to receive the teeth of the disk 73. It will be apparent that the toothed disks will tear and loosen the husk on the ear in such a manner as to enable the rubber covered portions of the rollers to more readily grip the same. Further, the rollers 71 and 72 are provided at one end with intermeshing toothed disks 75, which disks are adapted to engage the tip of the ear and tear the husk loose therefrom. The several sections comprising each roller are mounted upon shafts 76 which are journaled in the plates 64 and 65 and have arranged between the inner face of the plate and the ends of the roller collars 77 which serve to retain the sections in their positions on the shaft and also form supports for the lugs 53 in which the bearing rollers 51 of the feed belt are mounted, and thus prevent the feed rollers coming in contact with the teeth or with the husking rollers should the feed belt become slack. The second pair of rollers, 78, are built up merely of sections of rubber covered iron and serve to remove those portions of the husks which are not taken off by the first pair of rollers. Movement may be imparted to these rollers in any suitable manner, but we have here shown the shaft of each roller as extending beyond the supporting plate at one side of the machine and provided with a pinion 79, the pinions of the adjacent rollers intermeshing. One of these shafts, preferably the shaft of the roller 71, extends beyond the pinion and has mounted thereon a sprocket wheel 80, about which extends a sprocket chain 81 which also extends about a sprocket wheel 82 on the drive shaft 32. This sprocket chain also extends about an idle sprocket wheel 83 adjustably mounted on the main frame and serving both as a guide and as a tightener for the chain.

Suitable devices are arranged above the husking rollers of each pair to engage the ear of corn and hold the same firmly in engagement with the husking roller and to rotate the same while it is in engagement with these rollers. These devices preferably consist of rotary members, such as the rotary brushes 84, one of which is supported above each pair of husking rollers and preferably has its axis arranged between the vertical planes of the axes of the two husking rollers constituting the pair. In order that the rotary members or brushes may accommodate themselves to ears of varying thickness and may exert a uniform pressure on the ears they are so mounted as to be capable of a vertical movement. To accomplish this the first brush, in the order in which they are encountered by the ear, is journaled in the ends of a pair of parallel arms 85 which extend rearwardly from the shaft 28, on which they are pivotaly mounted. The second brush 84 is journaled in the forward ends of a second pair of arms 86 which are pivotaly mounted upon the shaft of the first brush 84. The two brushes 84 are connected one to the other by means of a sprocket chain 87 extending about sprocket wheels 88 mounted on the shafts of the respective brushes. The first brush 84 is positively rotated by means of a sprocket chain 89 extending about a sprocket wheel 90 on one end of the shaft of the brush and about a second sprocket wheel 91 mounted on the shaft 28. In this manner the brushes are positively rotated and serve not only to hold the ears of corn in engagement with the husking rollers and to rotate the ears of corn but also serve to remove the silk from the ears of corn after the husks have been removed. The brushes engage the ear and remove the silk therefrom simultaneously with the action of the husking rollers, the brush engaging the silk as soon as the rollers have pulled the husk from the ear sufficiently to expose the silk.

As above stated, the husking rollers of the first pair are provided with two intermeshing toothed disks 75 which assist in loosening and tearing off the husks from the ears by engaging this husk near the tip of the ear. Inasmuch as the ears vary in length and all of the ears have been moved to the opposite side of the main frame in order that the butts may be removed therefrom, it is desirable that some means should be

provided for moving the ear toward those ends of the rollers having the toothed disks 75; thereby enabling these disks to engage the tip of the ear. For this purpose we have mounted at a point adjacent to the first pair of husking rollers two tapered rollers which are supported in such a position as to engage the ears of corn and move the same toward that side of the machine opposite the cutter 8. These tapered rollers are shown at 92 and each roller is provided with a shaft 93 which extends through a longitudinal bearing formed in a bearing bracket 94, which bearing bracket has also a transverse bearing, by means of which it is pivotally supported on the shaft 17. That end of the shaft 93 which extends beyond the longitudinal bearing of the bracket 94 has secured thereto a bevel pinion 95 which meshes with a second bevel pinion 96 secured to the shaft 17. The shaft 93 of the roller extends through the slotted lower end of the bracket 97 which serves to limit the downward movement of the roller, but permits the roller to rise and fall and thus accommodate itself to the various sizes of ears. The two rollers may be arranged in any desired position, but we prefer to arrange them near the opposite side members of the main frame.

Suitable means are also provided for removing the silk and bits of husk from the husking rollers and maintaining the same free from obstructions of this character. This means preferably comprises a plurality of rotary brushes 98 which have their shafts journaled in brackets 99 which are mounted on the bearing plates in which are journaled the shafts of the husking rollers. These brushes are rotated by means of a sprocket chain 100 extending about sprocket wheels 101 secured to the ends of the shafts of the respective brushes and also extending about an idle sprocket wheel 102 adjustably mounted on the main frame and a sprocket wheel 103 secured to the shaft of the outer husking roller of the last pair.

The endless feed belt which has conveyed the ears of corn through the butt-removing mechanism, through the chute and across the husking rollers, discharges the same into a chute 104, which, in turn, delivers the husked ear into a receptacle or onto a suitable conveyer, as may be desired. The husks drop from the husking rollers onto an endless belt conveyer 105 which extends about drums or rollers 106 having their shafts journaled in brackets 107 which are adjustably mounted on the longitudinal side members 6. One of these shafts, that near the forward end of the machine, has a sprocket wheel 108 about which extends the sprocket chain 26 which also extends about the sprocket wheel 25 of the shaft 21 and the sprocket wheel 27 of the shaft 28. The butts which are severed by the rotary cutter drop into a chute 109 and are also delivered to the conveyer 105 which extends beyond the main frame at one end.

The operation of the machine as a whole will be readily understood from the foregoing description of the several parts thereof and it will be apparent that the construction and arrangement of the several parts is such that the ear of corn is first presented to the butting mechanism and after it has been acted upon by this butting mechanism is fed to the husk removing devices and is positively moved into a position to be properly acted upon by the husking rollers and by the husk loosening devices coöperating with said rollers; that the ear will be held in engagement with the husking rollers and rotated during the husking operation without bruising the grains of corn or injuring the ear; that the husking rollers will maintain a strong gripping action on the husks but will move apart to permit the passage of the husks, thus avoiding the choking of the rollers with the husks; and that the rollers and the husk-loosening devices will be freed from any husks or silks which may adhere thereto. It will further be apparent that the machine as a whole is of a very compact arrangement and is simple in its construction and operation.

It will further be noted that the removal of the butt of the ear serves to loosen the husks thereon and thus facilitate the action of the husking mechanism when the ear has been fed to the latter.

While we have here shown one form of our invention we wish it to be understood that this form is chosen for the purpose of illustration only and we do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

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

1. In a machine of the character described, the combination, with a pair of husking rollers, of a positively rotated brush mounted above and parallel with said husking rollers for movement toward and away from the same, and feeding mechanism comprising an endless belt having continuous movement transversely to the axes of said husking rollers and having ear engaging members extending substantially parallel with said rollers and arranged to pass between said rollers and said brush, said brush having bristles arranged to operatively engage said ears of corn while they are being fed forward.

2. In a machine of the character described, the combination, with a pair of husking rollers, of a positively rotated brush arranged above and parallel with said husking

rollers and free to move vertically relatively thereto, and a feeding device moving continuously in one direction to engage the ears of corn and positively move the same between and transversely to the axes of said brush and said husking rollers.

3. In a machine of the character described, the combination, with husking rollers, of a chute leading to said husking rollers having an inclined portion remote from said rollers and having a portion between said inclined portion and said rollers arranged in a substantially horizontal plane, and a feeding device comprising an ear-engaging member arranged to travel over the horizontal portion of said chute, transversely to the axes of said rollers, engage the rear side of the ear of corn thereon and move the same into a position substantially parallel with said husking rollers.

4. In a machine of the character described, the combination, with a pair of husking rollers, coöperating husk-loosening devices arranged at one end of said pair of rollers, and means for feeding ears of corn transversely to the axes of said rollers, of means other than said feeding means for moving said ears of corn transversely to the line of feed and toward said husk-loosening devices.

5. In a machine of the character described, the combination, with a pair of husking rollers, a husk loosening device arranged at one end of said pair of rollers, an ear-supporting device leading to said rollers, and a feeding device to move the ears of corn over said supporting device toward said husking rollers, of a positively rotated roller mounted above said ear-supporting device on an axis substantially parallel with the line of feed, to engage the ears of corn on said supporting device and move the same transversely to the line of feed and toward said husk looseni g device.

6. In a machine of the character described, the combination, with a pair of husking rollers, each roller comprising a shaft, toothed disks mounted on said shaft at adjacent ends of said rollers, an ear supporting device leading to said husking rollers, and feeding mechanism to move the ears over said supporting device toward said husking rollers, of a roller arranged above said supporting device to engage the ears thereon and movable vertically relatively to said supporting device, and means to rotate said roller about an axis substantially parallel with the line of movement of said feeding device.

7. In a machine of the character described, the combination, with husking rollers and feeding mechanism comprising flexible supports, and feeding members carried by said supports and adapted to move over said husking rollers, of means other than said supports for supporting said feeding members out of engagement with said rollers.

8. In a machine of the character described, the combination, with a pair of husking rollers, one of said rollers having teeth, feeding mechanism comprising an endless belt, arms depending therefrom, and feeding members supported between said arms, of disks carried by said rollers at the opposite ends thereof to engage said arms and support said feeding members out of engagement with the teeth of said husking roller.

9. In a machine of the character described, a pair of husking rollers each comprising a shaft, and a plurality of sections of yielding material removably mounted on said shaft, disks of non-yielding material mounted on the respective shafts between the adjacent ends of said sections, the disks on one shaft having teeth which project beyond the outer surfaces of said rollers and the disks on the other shaft being of a diameter less than the diameter of said roller sections, thus providing grooves to receive said teeth.

In testimony whereof, we affix our signatures in presence of two witnesses.

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SAMUEL E. MORRAL.

Witnesses:
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H. C. SCHULTZ.