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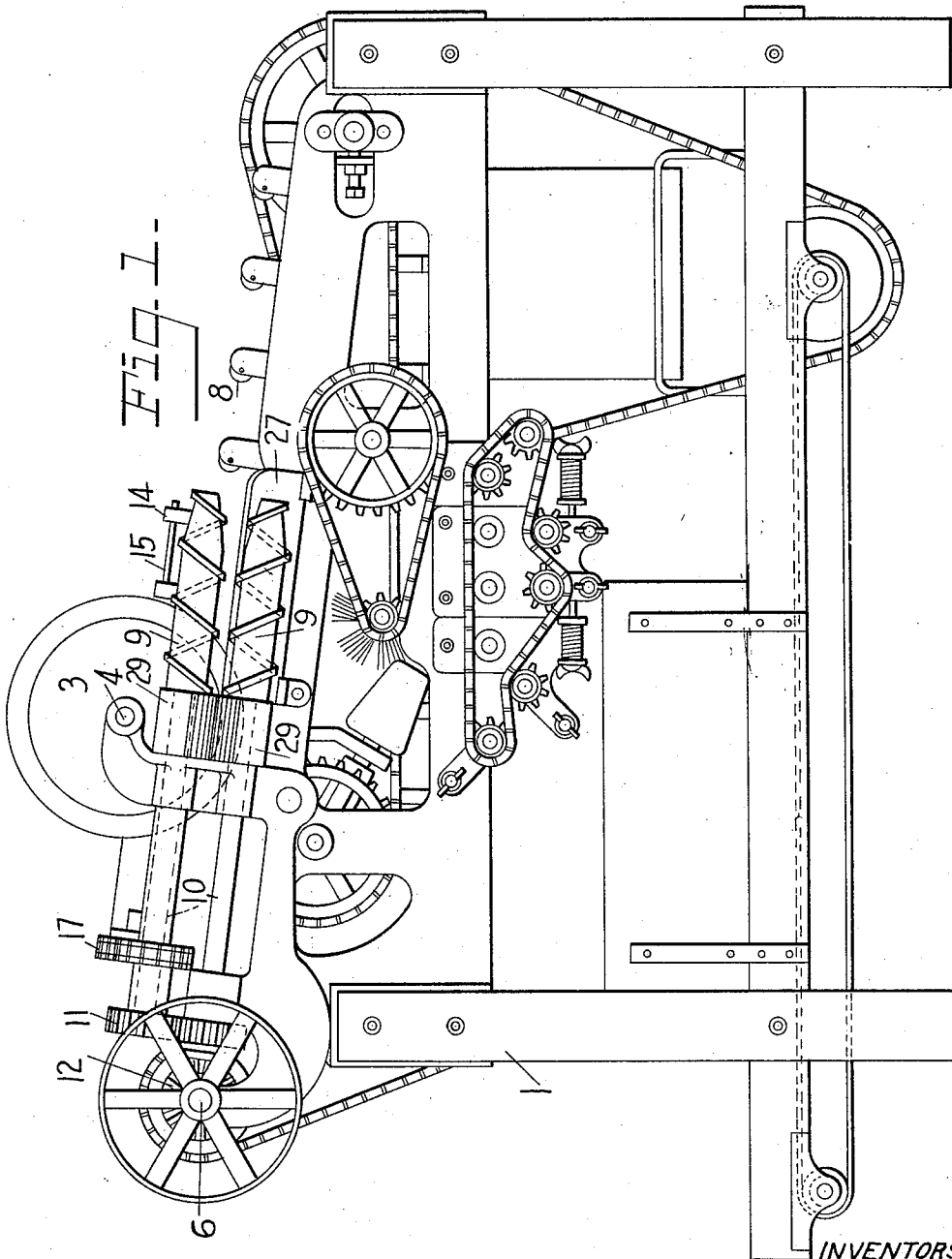
S. E. MORRAL ET AL

1,763,173

BUTT REMOVING MECHANISM

Filed June 17, 1924

3 Sheets-Sheet 1



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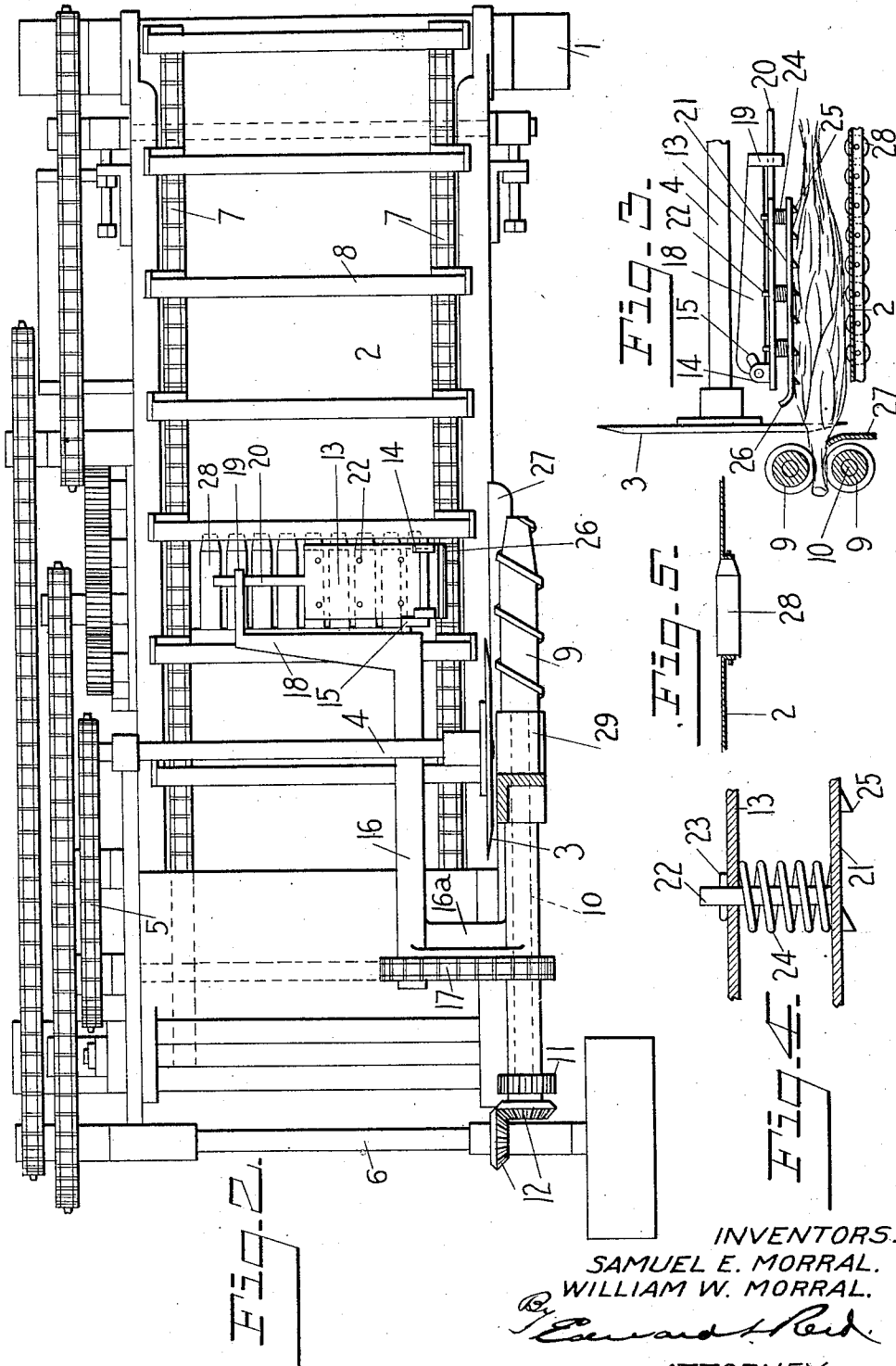
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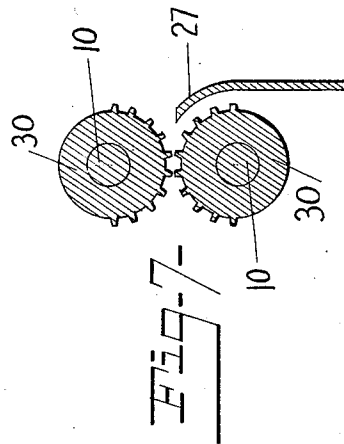
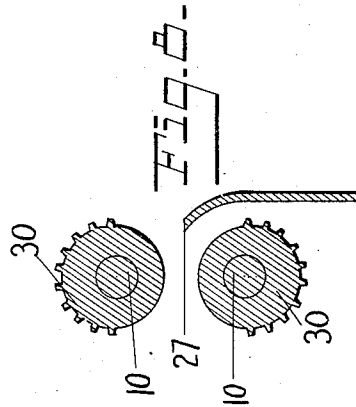
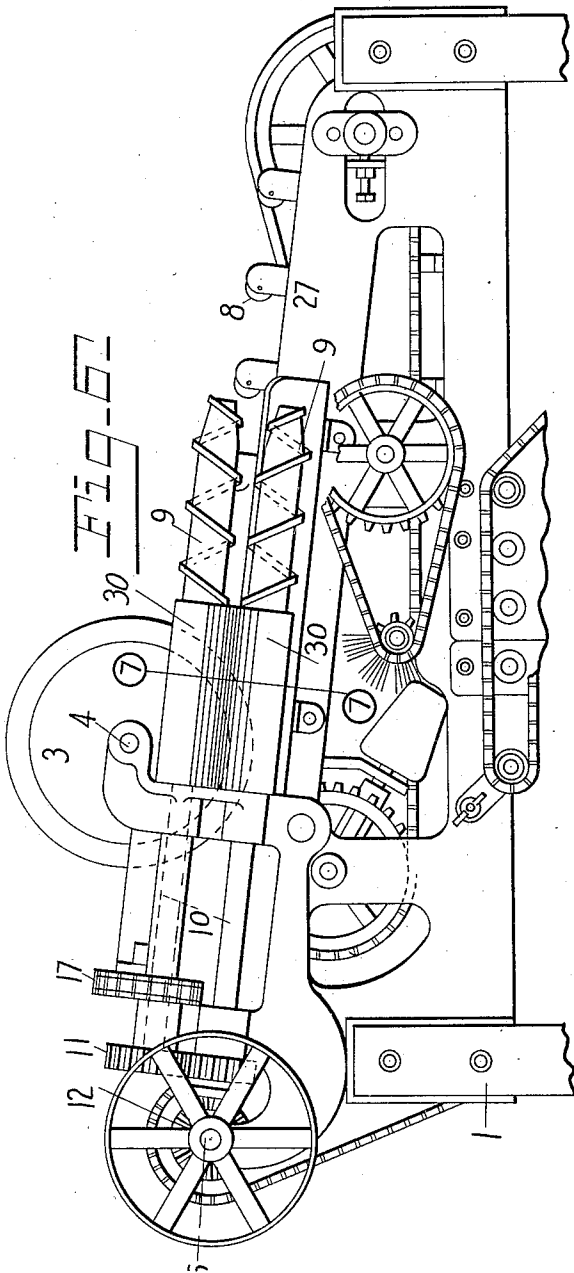
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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

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## BUTT-REMOVING MECHANISM

Application filed June 17, 1924. Serial No. 720,683.

This invention relates to butt removing mechanism and is designed more particularly for removing the butts from ears of green corn preparatory to husking the same.

One object of the invention is to provide a device of this kind in which ears of all sizes will be accurately positioned with relation to the butt removing device.

A further object of the invention is to provide a transverse feeding device which will act on ears of various sizes to move them toward the gaging device without injuring the ears.

A further object of the invention is to provide a machine of this kind with means for withdrawing the severed butts and preventing the clogging of the mechanism by the butts and loosened husks.

Other objects of the invention will appear as the device is described in detail.

In the accompanying drawings Fig. 1 is a side elevation of a machine embodying our invention; Fig. 2 is a plan view of the same, partly broken away; Fig. 3 is a transverse section taken through the feeding mechanism in Fig. 2; Fig. 4 is a sectional view of a portion of the feeding device; Fig. 5 is a detail view of one of the rollers in the ear supporting table; Fig. 6 is a side elevation of a portion of the machine showing certain modifications therein; Fig. 7 is a section taken through the butt withdrawing rollers on the line 7—7 of Fig. 6, showing the rollers in their gripping positions; and Fig. 8 is a similar section showing the rollers in their separated positions.

In these drawings we have illustrated the invention as applied to a combined butting and husking machine of a well known type, but it will be understood that the invention may be applied to machines of various kinds either with or without a husking device and that the feeding and gaging devices themselves may take various forms without departing from the spirit of the invention.

The machine here shown comprises a frame 1 which supports a feed table 2 extending lengthwise thereof and over which the ears of corn are conveyed to the butt removing device, which is here shown as a rotary cutter

3 mounted at one edge of the table 2 and secured to a shaft 4 journaled in suitable bearings upon the frame and driven by a sprocket chain 5, through intermediate connections, from the main drive shaft 6. The ears of corn are moved over the table toward the butting device by a suitable conveyor which, in the present instance, consists of parallel chains 7 arranged near the respective edges of the table 2 and carrying transverse ear engaging members or cleats 8 which engage the ears and move them lengthwise of the machine toward the butting device. Arranged along one edge of the table adjacent to the rotary cutter 3, are two spiral rollers 9 having spiral ribs extending circumferentially thereof in opposite directions and also having their forward ends tapered to facilitate the entrance of the stem of the ear between the rollers. These rollers are carried on shafts 10 journaled in suitable bearings on the main frame and connected one to the other by spur gears 11 and one of the shafts, in the present instance the lower one, is connected with the main drive shaft 6 by beveled gearing 12. These spiral rollers are well known in the art and act as a gaging device to properly position the ear of corn with relation to the butt removing device and to advance the butt during the cutting operation and thereby prevent it from binding on the cutter.

The ears of corn may be moved transversely to the table 2 and the main conveyor in any suitable manner which will cause the same to engage the gaging device and be properly positioned thereby. In the present machine we have employed a transverse feeding device similar to that shown in Patent No. 1,376,720 granted to W. W. Morral on May 3, 1921, and have so constructed the same that the soft grains of corn will not be injured during the transverse feeding operation. This transverse feeding device preferably comprises a main or supporting member 13, which is here shown in the form of a plate, and is mounted for oscillatory movement transversely to the line of movement of the main conveyor. This movement may be imparted to the supporting member in any suitable manner but, as here shown,

its outer edge, that is, the edge adjacent to the gaging device, is provided with bearings 14 in which is journaled the offset portion of a crank shaft 15, the main portion of which is journaled in a tubular bearing 16 mounted on the main frame. This tubular bearing is here shown as carried by an arm 16<sup>a</sup> journaled on the shaft 10 of the upper gaging roller, so that the transverse feeding device may have a swinging movement about the axis of that shaft. In the present instance, this crank shaft is driven by means of a sprocket chain 17 which connects with the upper roller shaft 10 of the gaging device. At that end adjacent to the transverse feeding device the tubular bearing is provided with a laterally extending bracket 18 having an apertured portion 19 in which is loosely mounted a reduced portion or arm 20 of the supporting member 13. It will be apparent, therefore, that the rotation of the shaft 15 will cause the supporting plate 13 to be moved transversely to the main conveyor with an oscillating movement. Arranged beneath and supported by the upper member or plate 13 is a lower or contact member 21 which, in the present instance, is also in the form of a plate arranged substantially parallel with the plate 13 and connected therewith by means of a series of studs or pins 22 extending upwardly therefrom through openings in the plate 13, so that the contact member is freely movable toward and from the supporting member. Cotter pins 23 extend through the studs 22 above the plate 13 and serve to limit the movement of the contact member away from the supporting member. Springs 24 coiled about the studs 22 between the two members of the device serve to press the contact member downwardly and to cause the same to engage the ears with a yielding contact. If desired, the lower surface of the contact member 21 may be roughened or provided with teeth, as shown at 25, and its outer end may be curved upwardly, as shown at 26, to prevent it from biting in to the husks on the ear. It will be apparent that when the feeding device is at its inner position that is, the right hand position in Fig. 3, it will be moved downwardly to cause the contact member to engage the ear of corn which is being advanced by the main conveyor and that the device will then move to the left and shift the ear transversely to cause it to engage the gaging device. After the ear is in engagement with the gaging device the crank shaft will lift the outer end of the feeding device so as to move the contact member out of engagement with the ear and will swing the device as a whole to the right and then downwardly into engagement with the next ear. The swinging or oscillating movement of the feeding device is so timed with relation to the movement of the main conveyor that it will move downwardly into its opera-

tive position just in advance of one of the transverse feeding members or cleats 8 and will quickly move the ear into a position to be butted and will then be lifted, retracted and moved downwardly again just in time to engage an ear which is being advanced by the succeeding feeding member or cleat 8. It will be obvious that this device must act upon ears of all sizes and if it engaged the ear with a rigid or non-yieldable contact the pressure on a large ear would be such as to crush the soft grains of corn and even on a relatively small ear there would be danger of crushing some of the grains. By mounting the feeding device for movement as a whole toward and from the feed table, as by swinging the tubular bearing 16 and bracket 18 about the axis of the shaft 10, and providing the feeding device with a yieldable contact member it may be caused to so act upon ears of all sizes as to properly feed them toward the gaging devices, and the contact member will yield to properly position itself with relation to the ear and while it will engage any ear with sufficient pressure to move the same transversely it will not crush the grains of corn. Preferably the feed table is provided with a plurality of parallel rollers 28 extending lengthwise thereof and arranged beneath the path in which the feeding device moves. These rollers serve to support the ears during the feeding operation and thereby facilitate the movement thereof transversely to the table. The rollers may have their forward ends tapered so that the ears will be readily moved onto the same by the main conveyor.

In this device we have also associated with the spiral rollers 9 a fixed member or guide 27 which is rigidly mounted on the main frame between the lower roller 9 and the table 2 and is so arranged that it will be engaged by the butt of an ear which is moved by the transverse feeding device and will limit the transverse movement of that ear, the stem of the ear extending beyond the guide and between the two rollers 9 where it will be engaged by the spirals and advanced at a speed corresponding to the speed at which the ear itself is advanced by the main conveyor. Preferably this guide is in the form of a bar extending parallel with the lower roller 9 and arranged close to the same with its upper edge slightly curved about the adjacent side of the roller. It will be apparent that any ear of corn which is moved transversely toward the gaging device will engage this fixed guide, regardless of the size of the ear, because the guide is arranged beneath the ear. Consequently all ears, regardless of their size, will be properly positioned with relation to the butt removing device and the stems of these ears will be acted upon by the rollers to advance the same during the butting operation. By thus combining with the gaging rollers

the guide or gaging bar 27 we entirely overcome the tendency of smaller ears to be drawn so far between the gaging rollers that substantial portions of the ears will be severed by the butt removing device, and are able to properly position ears of all sizes with relation to the butt removing device.

In the operation of a machine of this kind it has been found that the severed butts will sometimes wedge between the shafts of the two gaging rollers and clog the mechanism in such a way as to prevent the proper feeding of the ears to the butt removing device and that, further, there is a tendency of husks, which have been loosened by the severing of the butt, to wind about the shafts and thus interfere with the operation of the machine. To overcome these objectionable features we have provided, adjacent to the butt removing device and at the ends of the gaging devices, a device which will engage the severed butts and withdraw them from the butt removing device and gaging devices so that they will be discharged at the side of the machine and will not interfere with the operation thereof. This butt withdrawing device preferably comprises rollers and, in the present instance, where the gaging devices consist of rollers, they are mounted for rotation about the axes of the gaging rollers and are preferably rigidly secured thereto. We also prefer that these butt withdrawing rollers should be similar in character to snapping rollers and we have here shown them at 29 as mounted on the shafts 10 between the rear ends of the gaging rollers and the supporting bracket and have further shown them (see Figs. 7 and 8) as eccentrically mounted on the respective shafts 10 and so arranged that they will be spaced apart to permit the entrance of the stem or butt of the ear as the latter approaches the same and after the stem or butt has been placed between the withdrawing rollers the rotation of these rollers will cause them to grip the butt or stem and withdraw it as soon as it has been severed from the ear. Preferably the gripping portions of the rollers are serrated or provided with longitudinal ribs to enable them to firmly grip the stem or butt of the ear.

In Fig. 6 of the drawings we have shown the butt withdrawing rollers, 30, of such a length that they extend forwardly beyond the point of contact of the ear with the butt removing device or cutter and consequently will engage the stem of the ear before the ear is engaged by the butt removing device. In this manner the butt withdrawing rollers are caused to pinch off the long stems and remove such husks as may be attached thereto before the butt is severed, and when the butt is severed, if it does not fall free of the machine, it will be engaged by the butt withdrawing rollers and discharged at the side of the machine. The construction and arrangement of

the rollers is the same as that above described.

The operation of the mechanism will be readily understood from the foregoing description of the several parts thereof. Briefly it may be stated as follows. When the machine is in operation an ear of corn is placed on the table 2 in advance of each successive flight 8 with its butt toward that side of the table adjacent to the butt removing device. As each ear is advanced by the conveyor it is moved onto the rollers 28 and is engaged by the transversely moving device 21, the movement of which is so timed that it will move toward the gaging rollers in advance of each flight of the conveyor. This transverse feeding device causes the butt of the ear to be moved into engagement with the guide 27 and the stem to extend between the two spiral rollers. The guide cooperates with the rollers to positively limit the movement of the ear and prevent the same from being drawn between the rollers and the rotation of the rollers advances the butt of the ear at the same speed that the body of the ear is advanced by the conveyor and prevents any binding or twisting of the ear during the cutting operation. As the ear is moved past the cutter the butt withdrawing devices 29 move the butts away from the cutter and discharge the same, while the body of the ear, from which the butt has been removed, is carried rearwardly and discharged from the machine.

While we have shown and described one embodiment of our invention we wish it to be understood that we do not desire to be limited to the details thereof as various modifications may appear to a person skilled in the art.

Having now 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, a butt removing device, means for moving an ear toward said butt removing device, a stationary member to position said ear with relation to said butt removing device, means for moving said ear into engagement with said stationary member, and cooperating feeding members arranged adjacent to said stationary member to advance the butt of the ear during the butt removing operation.

2. In a machine of the character described, a butt removing device, means for moving an ear of corn toward said butt removing device, a stationary member to position said ear with relation to said butt removing device, means for moving said ear into engagement with said stationary member, and a pair of spiral rollers arranged adjacent to said stationary member to engage the stem of the ear and advance the same during the butt removing operation.

3. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing

device, a guide extending lengthwise of said conveyor near one edge thereof to position said ear with relation to said butt removing device, means to move said ear transversely to said conveyor and into engagement with said guide, and a feeding device arranged on the outer side of said guide and separate therefrom to engage the stem of said ear and advance the same during the butt removing operation.

4. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, a fixed guide bar extending lengthwise of said conveyor near one edge thereof to position said ear with relation to said butt removing device, means to move said ear transversely to said conveyor and into engagement with said guide bar, and spiral rollers arranged adjacent to and on the outer side of said guide bar to engage the stem of said ear and advance the same during the butt removing operation.

5. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, spiral rollers extending lengthwise of said conveyor near one edge thereof to engage the stem of the ear and advance the same toward the butt removing device, a guide bar mounted between said rollers and said conveyor and having its upper edge arranged below the top of the lower roller to position the ear with relation to said butt removing device, and means for moving the ear transversely to said conveyor and toward said guide bar.

6. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, spiral rollers extending lengthwise of said conveyor near one edge thereof to engage the stem of the ear and advance the same toward the butt removing device, a guide bar mounted between said rollers and said conveyor and having its upper edge arranged below the top of the lower roller to position the ear with relation to said butt removing device, and a bodily movable device arranged above said conveyor to engage said ear and move the same toward said guide bar.

7. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, means to position said ear with relation to said butt removing device, and a device mounted for oscillatory movement transversely to said conveyor to move said ear into engagement with said positioning means, said device comprising a yieldable portion to engage the ear.

8. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing de-

vice, means to position said ear of corn with relation to said butt removing device, and a device having bodily movement transversely to said conveyor to move said ear toward said positioning means, said device comprising a supporting member and a contact member yieldably connected with said supporting member and arranged to engage the ear.

9. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, means to position said ear with relation to said butt removing device, and a device comprising a supporting member mounted for swinging movement transversely to said conveyor, and a contact member yieldably connected with said supporting member and arranged to engage the ear and move the same toward said positioning means.

10. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, means to position said ear with relation to said butt removing device, and a device having bodily movement above and transversely to said conveyor to move said ear toward said positioning means, said device comprising a supporting member, an actuating device connected with said supporting member, a contact member mounted beneath said supporting member for movement toward and from the same, and springs interposed between said members.

11. In a machine of the character described, a butt removing device, a guide leading to said butt removing device, means for moving an ear of corn along said guide, a feeding device to move said ear toward said guide comprising a supporting member and contact member arranged beneath and yieldably connected with said supporting member, and means for imparting movement to said feeding device transversely to said guide.

12. In a machine of the character described, a butt removing device, a guide leading to said butt removing device, means for moving an ear of corn lengthwise of said guide, a shaft extending lengthwise of said guide and having an offset portion, a bracket having a guide opening, a supporting member pivotally supported at one end on the offset portion of said shaft and having a part secured to its other end and loosely mounted in said guide opening, a contact member arranged beneath said supporting member, studs carried by said contact member and extending through said supporting member, and springs coiled about said studs between said members.

13. In a machine of the character described, a feed table, a butt removing device arranged near one edge of said feed table, a conveyor having transverse members to engage ears of corn and move them successively toward said butt removing device, a gaging

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device arranged near the edge of said table to position said ears with relation to said butt removing device, a feeding device mounted for transverse movement with relation to said table and having a yieldable member to engage the ears of corn and move them into contact with said gaging device, and means for causing said feeding device to engage an ear of corn as it is advanced by one of said transverse members, move the same quickly into contact with said gaging device, release the same and move rearwardly and into contact with an ear which is being advanced by the next succeeding transverse member of said conveyor.

14. In a machine of the character described, a feed table, a butt removing device arranged near one edge of said feed table, a conveyor having transverse members to engage ears of corn and move them successively toward said butt removing device, a gaging device arranged near the edge of said table to position said ears with relation to said butt removing device, a device mounted above said conveyor for oscillatory movement in a substantially vertical plane and having a yieldable part to engage an ear of corn on said table and move the same toward said gaging device, means for causing said device to engage an ear of corn which is being advanced by one of the transverse members of said conveyor, move the same quickly into engagement with said gaging device and then move upwardly, rearwardly and downwardly to engage an ear which is being advanced by the next succeeding transverse member of said conveyor.

15. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, a gaging device extending alongside of said conveyor near one edge thereof to position said ear with relation to said butt removing device, a feeding device to move said ear transversely to said conveyor and into engagement with said gaging device, a vertically movable supporting member for said feeding device, and means to move said feeding device relatively to said supporting member to cause it to engage an ear of corn and move the same toward said gaging device and to then retract said feeding device to a position to engage the succeeding ear of corn.

16. In a machine of the character described, a feed table, a butt removing device arranged near one edge of said table, a conveyor to move an ear of corn along said table toward said butt removing device, a gaging device near one edge of said table to position said ear of corn with relation to said butt removing device, a transverse series of rollers mounted in said table adjacent to said gaging device and each extending lengthwise of said table, a feeding device mounted for oscillatory movement in a substantially vertical plane above said feeding rollers, and means

for actuating said feeding device to cause it to engage an ear of corn resting upon said rollers and move said ear toward said gaging device.

17. In a machine of the character described, the combination with a butt removing device, a conveyor to move an ear of corn toward said butt removing device, and means to position said ear with relation to said butt removing device, of means for moving said ear transversely to said conveyor to cause it to engage said positioning means and comprising a device having teeth to engage said ear, and a device to retain said ear in contact with said toothed device, one of said devices being yieldable.

18. In a machine of the character described, the combination with a butt removing device, a conveyor to move an ear of corn toward said butt removing device, and means to position said ear with relation to said butt removing device, of means for moving said ear transversely to said conveyor to cause it to engage said positioning means and comprising a device mounted for oscillatory movement and having teeth to engage said ear, and a device to retain said ear in contact with said toothed device, one of said devices being yieldable.

19. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging devices arranged alongside of said conveyor to position said ears with relation to said butt removing device, and means mounted near the end of said gaging device and adjacent to said butt removing device to withdraw the severed butts.

20. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears with relation to said butt removing device, and means mounted beyond said gaging rollers and adjacent to said butt removing device to withdraw the severed butts.

21. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears with relation to said butt removing device, and rollers mounted for rotation about the axes of the respective gaging rollers adjacent to said butt removing device and arranged to engage the severed butt and withdraw the same.

22. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears with relation to said butt removing device, and rollers mounted for rotation about the axes of

the respective gaging rollers adjacent to said butt removing device and so arranged that during a portion of their rotation a space will be provided between them to receive the stem of an ear of corn and during another portion of their rotation the corresponding portions thereof will be moved one toward the other to grip said stem and withdraw the butt.

23. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears with relation to said butt removing device, and rollers mounted at the rear ends of said gaging rollers, rigidly connected thereto for rotation therewith and arranged adjacent to said butt removing device, said rollers being arranged to receive between them a stem of an ear of corn and to grip said stem and withdraw the butt when the latter has been severed.

24. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears of corn with relation to said butt removing device, shafts on which said gaging rollers are mounted, and rollers eccentrically mounted on the respective shafts at the rear ends of said gaging rollers and adjacent to said butt removing device, to engage the severed butts and withdraw the same.

25. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears of corn with relation to said butt removing device, shafts on which said gaging rollers are mounted, and rollers eccentrically mounted on the respective shafts at the rear ends of said gaging rollers and adjacent to said butt removing device, to engage the severed butts and withdraw the same, those portions of said rollers having the longer radii being serrated to provide gripping surfaces.

26. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears with relation to said butt removing device, and means arranged beyond said gaging rollers to engage the stem of an ear of corn and sever the same before said ear is acted upon by said butt removing device and to withdraw the butt after it has been severed by said butt removing device.

27. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears with rela-

tion to said butt removing device, and a pair of rollers mounted for rotation about the axes of the respective gaging rollers adjacent to said butt removing device and extending forwardly beyond said butt removing device to engage the stem of an ear of corn and sever the same before said ear is acted upon by said butt removing device.

28. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears of corn with relation to said butt removing device, shafts on which said gaging rollers are mounted, and rollers eccentrically mounted on the respective shafts at the rear ends of said gaging rollers and adjacent to said butt removing device and extending forwardly from said butt removing device to engage the stem of an ear of corn and sever the same before said ear is engaged by said butt removing device.

29. In a machine of the character described, a butt removing device, a conveyor to feed ears of corn to said butt removing device, gaging rollers arranged alongside of said conveyor to position said ears with relation to said butt removing device, means mounted beyond said gaging rollers and adjacent to said butt removing device to withdraw the severed butts, and a guide bar mounted between one of said gaging rollers and said conveyor having its upper edge arranged adjacent to the upper surface of said gaging roller and extending for the full length of said gaging roller and corresponding butt withdrawing roller.

30. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, gaging rollers to position said ear of corn with relation to said butt removing device, a device having bodily movement above and transversely to said conveyor to move said ear toward said gaging rollers, said device comprising a yieldable contact member to engage said ear, and butt withdrawing rollers mounted at the rear ends of the respective gaging rollers and adjacent to said butt removing device.

31. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, gaging rollers to position said ear of corn with relation to said butt removing device, a device having bodily movement above and transversely to said conveyor to move said ear toward said gaging rollers, said device comprising a yieldable contact member to engage said ear, and eccentrically arranged rollers mounted for rotation about the axes of the respective gaging rollers at the rear ends thereof and adjacent to

said butt removing device to withdraw the severed butts.

32. In a machine of the character described, a butt removing device, a conveyor to move an ear of corn toward said butt removing device, gaging rollers to position said ear of corn with relation to said butt removing device, a device having bodily movement above and transversely to said conveyor to move said ear toward said gaging rollers, said device comprising a yieldable contact member to engage said ear, and eccentrically arranged rollers mounted for rotation about the axes of the respective gaging rollers at the rear ends thereof and adjacent to said butt removing device, said eccentric rollers extending forwardly from said butt removing device to engage the stem of an ear of corn before said ear is engaged by said butt removing device.

33. In a machine of the character described, a butt removing device, means for moving an ear of corn toward and past said butt removing device, a stationary member to position said ear with relation to said butt removing device, and co-operating feeding members arranged adjacent to said stationary member to advance the butt of the ear during the butt removing operation.

34. In a machine of the character described, a butt removing device, means for moving an ear of corn toward and past said butt removing device, a stationary member to position said ear with relation to said butt removing device, and a pair of spiral rollers arranged adjacent to said stationary member to engage the stem of the ear and advance the same during the butt removing operation.

In testimony whereof we affix our signatures hereto.

SAMUEL E. MORRAL.  
WILLIAM W. MORRAL.