

Feb. 9, 1932.

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1,844,344

BUNCHER ATTACHMENT FOR COMBINED HARVESTERS AND THRESHERS

Filed Jan. 22, 1929

3 Sheets-Sheet 1

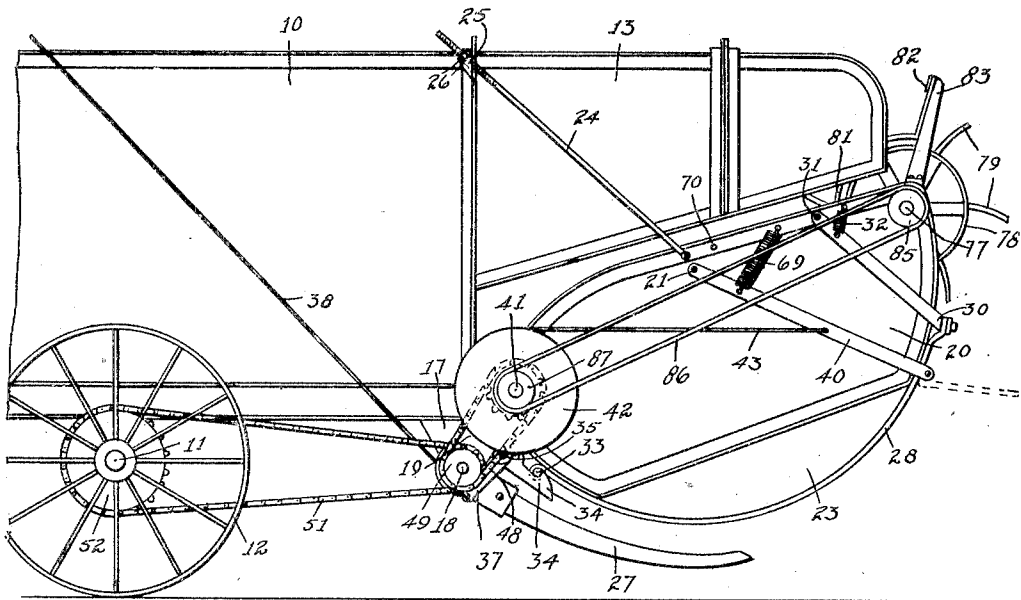


Fig. 2.

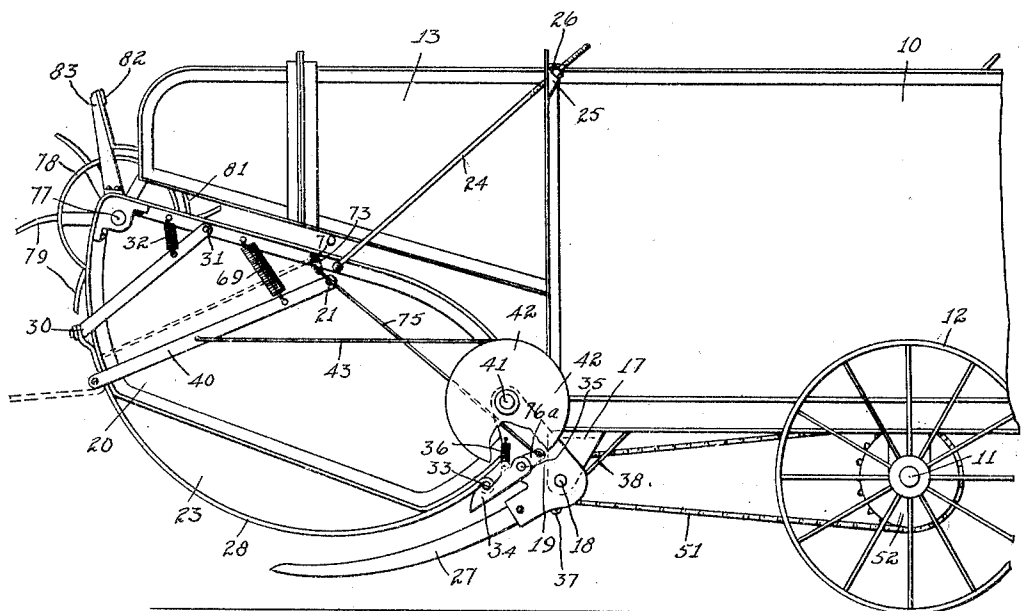


Fig. 1.

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3 Sheets-Sheet 2

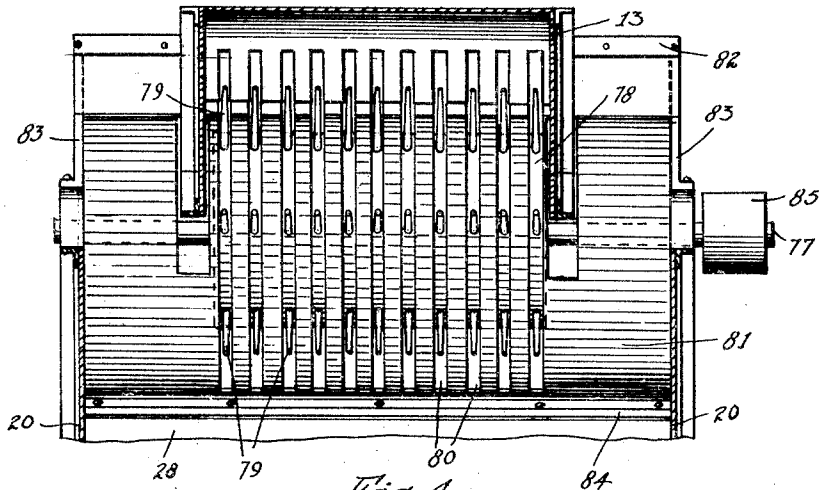


Fig. 4.

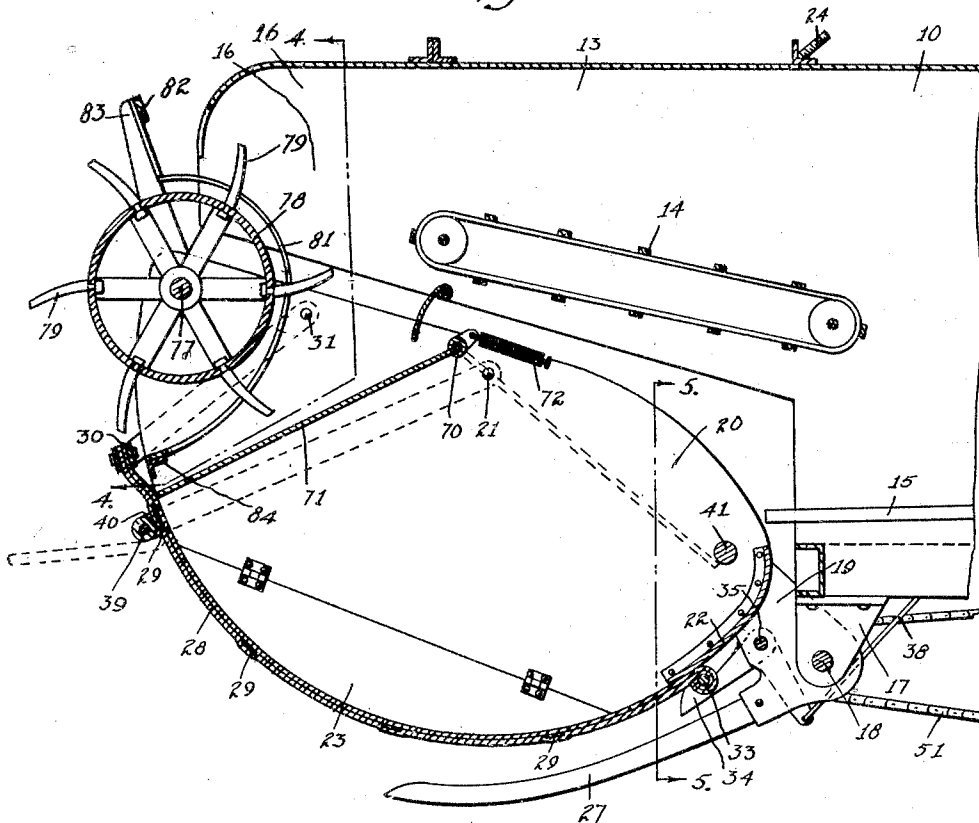


Fig. 3.

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3 Sheets-Sheet 3

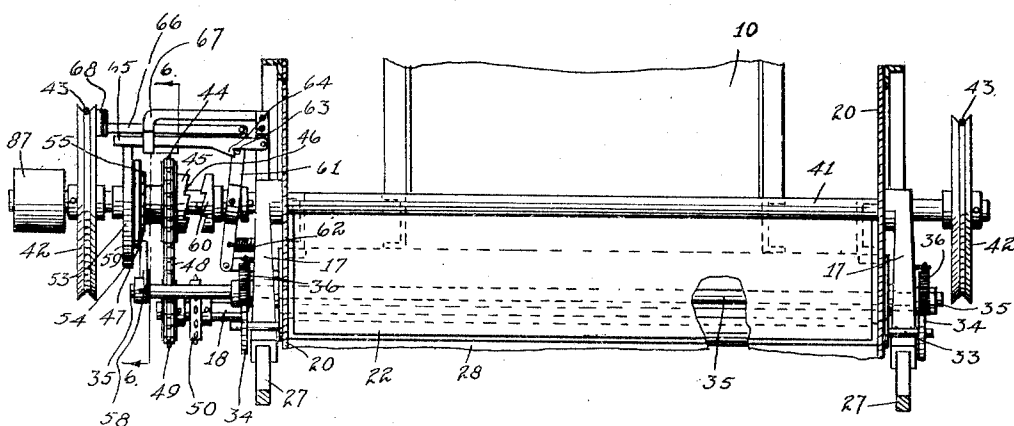
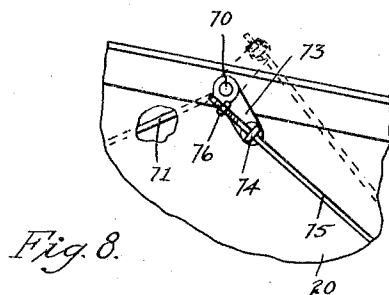
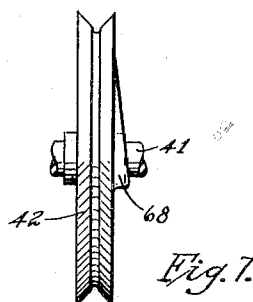
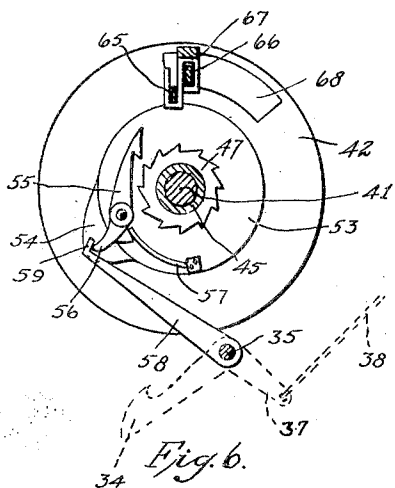


Fig. 5.

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UNITED STATES PATENT OFFICE

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BUNCHER ATTACHMENT FOR COMBINED HARVESTERS AND THRESHERS

Application filed January 22, 1929. Serial No. 334,283.

The object of my invention is to provide a buncher attachment for combined harvesters and threshers of simple, durable and inexpensive construction, whereby the straw delivered from the thresher may be dumped in piles, and the piles arranged in wind rows, so that the straw may be easily and quickly gathered.

A further object is to provide a buncher attachment which may be attached to that type of threshers delivering straw directly to the ground, having means whereby comparatively compact and well shaped bunches may be formed without scattering the material over the ground surface as the dumping takes place.

A further object is to provide a buncher adapted to be used in connection with a thresher of that type in which the delivery ends of the riddles and the separating mechanisms communicate with the open end of the thresher to deliver material to the buncher, and to provide in connection with the buncher improved means whereby the delivery end of the riddles will be protected against material being formed in the buncher to prevent clogging of said riddles.

A further object is to provide a buncher attachment for combined harvesters and threshers having means whereby the buncher will be automatically dumped when it becomes filled, to prevent clogging of the riddles and separating devices of the threshing machine.

A further object is to provide in a bunching attachment of the type above described improved means whereby the straw delivered to said bunching device will be formed in the buncher under slight pressure, to increase the amount of material carried by the buncher and at the same time make a more compact pile which will not readily blow apart and become scattered after it has been delivered to the ground surface.

A further object is to provide in a buncher of the type above described, having a flexible bottom member adapted to swing from a closed position to an open position, improved means for manually tripping the bot-

tom, and automatic means for returning the bottom to its closed position.

A further object is to provide a buncher attachment for combined harvesters and threshers adapted to receive straw from the threshing machine and bunch the same, and to so mount the buncher that the bottom of the buncher may be carried close to the ground surface to increase the capacity of the buncher and at the same time provide means whereby the bottom of the buncher may be protected from injury by preventing it from engaging the ground surface.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of the rear end of a threshing machine such as used in combined harvesters and threshers, showing the manner in which my improved buncher is attached thereto.

Figure 2 is a side elevation of the same taken from the opposite side of the machine.

Figure 3 is a longitudinal sectional view.

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

Figure 5 is a detail sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a detail sectional view taken on the line 6—6 of Figure 5.

Figure 7 is a detail view of one of the sheaves for operating the dump returning mechanism, showing the cam for throwing said mechanism out of operation.

Figure 8 is an enlarged detail view of a portion of the automatic trip mechanism for dumping the buncher.

The numeral 10 indicates a threshing machine having an axle 11 and supporting wheels 12. The rear end of the threshing machine is provided with a delivery hood 13, which is provided with a conveyor 14 for discharging the straw from the thresher after it has been cleaned. The threshing machine is provided with the ordinary riddles 15.

The conveyor 14 delivers the straw through

the space 16 through the rear end of the hood, while the chaff, dust and the like are delivered between the forward end of the conveyor 14 and the riddles 15.

5 My improved buncher is secured to the threshing machine by means of suitable brackets 17 rigidly secured to the rear end of the threshing machine frame. Said brackets are designed to carry a transversely
10 arranged shaft 18 which provides a pivot member for suitable brackets 19 to which the buncher is attached.

The buncher comprises side members 20, the lower edges of which are formed circular
15 from pivot points 21. The front ends of the side members 20 are connected by a curved plate 22, the upper edge of which terminates at a point substantially in line with the riddles 15. The lower edge of each of the
20 side members 20 is provided with a hinged sector 23. The said sectors have their lower edges adapted to swing inwardly for purposes hereinafter made clear. The top edge of the side members 20 are substantially parallel with the lower edge of the hood 13.

The buncher frame is pivotally supported so that its free end is adapted to swing upwardly and downwardly. The buncher is supported against downward movement by
25 means of suitable rods 24 having their upper ends slidably mounted in brackets 25 and provided with screw threaded nuts 26 for adjusting the height of the buncher relative to the hood 13. The rods are slidably mounted
30 to permit upward movement of the buncher to permit it to ride over obstructions and the like.

Each of the brackets 18 is provided with a downwardly and rearwardly extending runner 27. These runners are normally carried
40 a slight distance above the ground surface and protect the bottom of the buncher by making engagement with the ground surface before the bottom has engaged the ground. The free end of the buncher is free to move
45 upwardly when such engagement is made.

The buncher is provided with a flexible bottom or dumping member 28, which may be formed of canvas or other suitable material,
50 having transversely arranged reinforcing devices 29. The rear end of the bottom 28 is connected to a yoke 30 having its ends pivotally connected to the side members 20 by rivets 31. Springs 32 are provided for imparting yieldable and rearward movement to the bottom member.

The forward edge of the member 28 is provided with a transversely arranged rod 33 designed to be supported by hooks 34 mounted
55 on a rock shaft 35. As shown in Figure 3, the flexible bottom 28 is supported adjacent to the curved edges of the side members 20 with the forward edge of the bottom adjacent to the under surface of the curved plate 22. A spring 36 is provided for yieldably retain-

ing the hook devices into engagement with the rod 33, and to support the bottom member 28 taut against the curved edges of the side members. The yoke 30 takes up any slack in the bottom member.

The shaft 35 is provided with a trip arm 37 having a trip rod 38 which projects upwardly and forwardly along one side of the threshing machine, so it may be operated
70 from any convenient point. When it is desired to dump the buncher, the rod 38 is pulled, causing the hooks 34 to disengage the rod 33, which will permit the flexible bottom member 28 to fall to the ground surface, and to be moved rearwardly as the threshing machine is advanced over the ground surface. The bottom member assumes the position shown by dotted lines in Figure 3.

For returning the bottom member 28, I have provided a roller 39 supported by means of arms 40 which are pivoted by suitable rivets in the side members 20 in the pivot centers 21. It will readily be seen that if the roller 38 is swung forwardly, the flexible bottom member will be gathered up and the outer ends of the arms 40 brought into engagement with the outer ends of the rod 33, after which the said rod will be forced into the hooks 34.

For mechanically operating the roller 39, I have provided in the upper ends of the brackets 19 a shaft 41 having at each end a sheave 42. Each of the sheaves is provided with a cable 43, the free ends of which are attached to the arms 40 in the manner clearly shown in Figures 1 and 2. Each of the sheaves 42 is rigidly secured to the shaft 41.

Referring to Figure 5, a sprocket wheel 44 is rotatively mounted on the shaft 41 having a hub 45, one end of which terminates in a clutch member 46. The other end of the hub is provided with a ratchet wheel 47. The sprocket wheel 44, the clutch member and the ratchet are continuously rotated through a sprocket chain 48 driven from a sprocket 49 mounted on the shaft 18. The shaft 18 has a sprocket 50 driven by a sprocket chain 51 from a sprocket 52 mounted on one of the wheels 12.

Rotatively mounted on the shaft 41 adjacent to the sprocket 47 is a cam disk 53 having a cam 54 on its periphery. The disk 53 is also provided with a pawl 55 designed to engage the ratchet 47 and having an outwardly extending lug 56. A spring 57 is designed to force the pawl into engagement with the ratchet 47.

The shaft 35 is provided with a trip arm 58 having a lug 59 designed to engage the lug 56 in such manner as to support the pawl out of engagement with the ratchet 47, when the hooks 34 are in engagement with the rod 33. Tripping of the hooks 34 causes the free end of the arm 58 to move downwardly

out of engagement with the lug 56 and the pawl 55 to engage the ratchet 47, which in turn will cause the disk 53 to rotate in unison with the ratchet wheel, for purposes herein-after made clear.

Feathered to the shaft 41 is a clutch member 60 designed to coast with the clutch member 46. Said clutch member 60 is actuated by means of a lever 61. The clutch member 60 is caused to engage clutch member 46 by means of an extensible spring 62. The clutch member is held out of engagement by means of a pin 63 in the lever 61 and a hook 64. The hook 64 is carried by a pivot lever 65.

The free end of the arm 61 is provided with a trip bar 66, slidably mounted in a suitable bearing 67 having its free end designed to be engaged by a cam 68 mounted on the inner face of the sheave 42, adjacent to the disk 53. The free end of the lever 65 is designed to be engaged by the cam 54. The operation of this part of the mechanism is as follows:

Assuming that the bottom member 28 is loaded and it is desired to dump the same, the rod 38 is pulled, causing the hooks 34 to disengage the rod 33 and the bottom permitted to fall to the ground surface. At the same time the lever 58 is lowered and the lug 56 disengaged, permitting the pawl 55 to engage the ratchet 47, which will cause the disk 53 to rotate and the cam 54 to travel toward the lever 65 during the time the bottom 28 is moving rearwardly in its dumping position.

When the dumping is complete, the cam 54 engages the free end of the lever 65, elevating the same which is mounted in a slotted bearing in the member 67, causing the lug 64 to disengage the pin 63, which will permit the clutch members 46 and 60 to engage, thereby causing the shaft 41 to be rotated and with it the sheaves 42 in a clockwise direction as shown in Figure 1, and the arms 40 to be moved forwardly, causing the flexible bottom member to be moved to its closed position. Just at the time the closing of the bottom member takes place, the cam 68 engages the free end of the bar 66, forcing the pin 63 beneath the lug 64 and the clutch members locked into an open position, which will continue the rotation of the shaft 41.

The cam 68 is moved out of engagement with the free end of the bar 67 by the rearward movement of the arms 40 through suitable springs 69 and at the same time returning the roller 39 to its normal position, as shown in Figure 3.

Rotatively mounted in the upper edge of the side members 20 is a shaft 70 to which a plate 71 is attached. The said plate 71 is designed to hang downwardly into the buncher and to swing forwardly to the dotted line position shown in Figure 3 as the buncher is filled with straw, forming what I shall term

a division plate for preventing the straw within the buncher from clogging the delivery end of the riddles 15 and from engaging the lower runs of the conveyor 14. The movement of the plate forwardly is limited by the shaft 41.

The shaft 70 is pivotally mounted in the side members 20 at a point above and rearward of the pivot center 21, so that the free end of the plate 71 will swing somewhat eccentrically within the buncher, to provide a space between its free end and the bottom of the buncher or the plate 22, which provides means for permitting chaff, which might gather on the top of the plate in its forward position of movement, to move downwardly into the buncher, and also permits the lower edge of the plate to swing above the chaff collected in the buncher from the riddles 15 during the time the plate 71 is moving forwardly. A spring 72 is provided for normally returning the plate 71 to its rearward position of movement.

One end of the shaft 21 is provided with an arm 73, having an eye bolt 74 pivotally mounted in its free end, which is designed to slidably receive one end of a rod 75, said end being screw threaded and provided with a nut 76. The opposite end of the rod 75 is pivotally connected to a short arm 76a mounted on the trip shaft 35. The parts are so adjusted that when the plate 71 is at its extreme forward position of movement the eye bolt 74 will engage the nut 76 and cause the hooks 34 to be unlatched from the rod 33, thereby providing means whereby the buncher will be automatically dumped when it has become filled, to prevent clogging of the delivery end of the conveyor 14.

On account of the rod 75 being slidably mounted in the eye bolt 74, this automatic trip mechanism in no way interferes with the manually controlled trip mechanism actuated through the rod 38, as it will readily be seen that as the rod 38 is pulled and the shaft 35 rocked, the rod 75 will be slid upwardly through the eye bolt 74. This provides means whereby the operator may ordinarily dump the bunches of straw in wind rows. The automatic device is provided to insure against clogging in case the operator should forget to manually trip the buncher, or in case the wind rows are too far apart so that the buncher becomes filled before the succeeding wind row has been reached.

The nut 76 may be screwed downwardly on the shaft 74 and thus provide means whereby the buncher will be automatically dumped before it is filled, in which case the operator may permit the machine to dump automatically on the first round or two, and thereby provide means whereby the proper spacing of the wind rows may be easily and quickly determined. After the first round has been made, the nut 76 may again be readjusted to

permit the automatic device to operate only when the buncher has become completely filled.

The wind rows will then be so spaced apart that the buncher will be dumped automatically before it is filled, and thus provide means whereby allowance may be made for variation in the quantity of straw fed to the buncher between the wind rows, on account of the variation in the width of the swath being cut, as well as the variation in the quantity of straw between the wind rows.

Rotatively mounted in the upper rear end of the side members 20 of the buncher, I have provided a shaft 77 on which is mounted a hollow cylinder 78 having substantially radially projecting teeth 79. The teeth 79 are arranged in series of circumferential rows, each row being designed to operate in a slot 80 in a circular shield plate 81. The plate 81 is mounted eccentrically with the cylinder 78. The upper end of the plate 81 is mounted on a cross bar 82 supported by suitable arms 83 from the side members 20. The lower end of the shield plate 81 is secured to an angle iron 84 also mounted between the side members 20.

The shield plate 81 is mounted back of the delivery end of the conveyor 14 in such manner that material delivered from said conveyor will be thrown on said plate and engaged by the teeth 79 and moved downwardly and withdrawn from the slots 80 near the lower end of the shield 81, to cause the teeth to disengage the material and at the same time force the material downwardly against the plate 71 and into the buncher in such manner that considerable compression of the material within the buncher takes place. One end of the shaft 77 is provided with a pulley 85 to receive a belt 86, by means of which the cylinder 78 is rotated through a belt 86 and a pulley 87 mounted on the shaft 41.

Thus it will be seen that means is provided whereby the quantity of material carried by the buncher will be considerably increased, as well as providing means whereby the bunch will be formed in a more compact and unitary manner so that when the said bunch is delivered from the buncher it will stand ordinary winds without being scattered over the field.

Thus it will be seen that I have provided a buncher of simple, durable and inexpensive construction, which may be easily and quickly applied to the thresher of a combined harvester and thresher, and when so applied provides means whereby comparatively large quantities of straw may be collected and gathered in the buncher and then delivered to the ground surface, without scattering, either manually or automatically, and provided in connection therewith means whereby a minimum amount of attention is required

on the part of the operator, which is an important factor in attachments of this kind, inasmuch as the operator has a large number of matters which require his attention.

It will further be seen that I have provided a buncher which may be carried comparatively close to the ground surface without injury.

The bottom edges of the members 20 are provided with the hinged members 23, which further provide means against injury to the said bottom edges, inasmuch as said members would swing inwardly if the bottom member made engagement with the ground surface. The said members 23 also provide means for automatically taking up slack in the member 28, due to the weight of the load carried therein, as said members are usually swung inwardly at the time the member 28 is hooked up on account of the tendency of said member 28 to assume a straight line when tension is applied thereto.

This part of my mechanism, as well as the flexible bottom member, are clearly disclosed in United States Letters Patent issued to me on February 1, 1927, Number 1,615,928, and April 3, 1928, Number 1,664,659.

I claim as my invention:

1. In combination, a combined harvester and thresher including a power device, a buncher supported by said thresher to receive straw from its delivery end, said buncher including a dump member adapted to move from a closed position to an open position, means for retaining said dump member in its closed position, means operated from said power device for returning said dump member from an open position to a closed position after the dumping operation has been completed, and means for releasing said retaining means and setting into operation said dump member returning means.

2. In combination, a combined harvester and thresher including a power device, a buncher supported by said thresher for receiving straw from its delivery end, said buncher including a flexible dump member adapted to move from a closed position to an open position, means for retaining said dump member in its closed position, means operated by said power device for returning said dump member to its closed position after the dumping operation has been completed, manually operated means for releasing said retaining means and setting into operation said dump member returning mechanism, and means actuated upon the buncher becoming filled for automatically releasing said retaining means.

3. In combination, a combined harvester and thresher including a power device, a buncher supported by said thresher to receive straw from its delivery end, said buncher including a dump member adapted to move from a closed position to an open

position, means for retaining said dump member in its closed position, means operated from said power device for returning said dump member from an open position to a closed position after the dumping operation has been completed, means for releasing said retaining means and setting into operation said dump member returning means, and a division plate movably mounted within said buncher for shielding the delivery end of the threshing mechanism adjacent to said buncher.

4. In combination, a combined harvester and thresher including a power device, a buncher supported by said thresher to receive straw from its delivery end, said buncher including a dump member adapted to move from a closed position to an open position, means for retaining said dump member in its closed position, means operated from said power device for returning said dump member from an open position to a closed position after the dumping operation has been completed, a division plate movably mounted within said buncher for shielding the delivery end of the threshing mechanism adjacent to said buncher, and means actuated by said plate when it has reached a predetermined position of its movement for automatically releasing said retaining means and setting into operation said dump member returning means.

5. In combination, a combined harvester and thresher including a power device, a buncher supported by said thresher to receive straw from its delivery end, said buncher including a dump member adapted to move from a closed position to an open position, means for retaining said dump member in its closed position, means operated by said power device for returning said dump member from an open position to a closed position after the dumping operation has been completed, means for releasing said retaining means and setting into operation said dump member returning means, and means for receiving straw from the threshing machine and delivering it to said buncher in a packed and compressed condition.

6. In combination, a combined harvester and thresher including a power device, a buncher supported by said thresher to receive straw from its delivery end, said buncher including a dump member adapted to move from a closed position to an open position, means for retaining said dump member in its closed position, means operated from said power device for returning said dump member from an open position to a closed position after the dumping operation has been completed, a division plate movably mounted within said buncher for shielding the delivery end of the threshing mechanism adjacent to said buncher, means actuated by said plate when it has reached a predetermined position of its movement for automati-

cally releasing said retaining means and setting into operation said dump member returning means, and means for receiving straw from the threshing machine and delivering it to said buncher in a packed and compressed condition.

7. In combination, a combined harvester and thresher, a buncher supported adjacent to the delivery end of said thresher to receive straw therefrom, means for feeding said delivered straw to said buncher under slight compression, a movable shield plate within said buncher, and means actuated by said shield plate for automatically dumping said buncher when it has become filled.

8. In combination, a combined harvester and thresher, a buncher supported by said thresher for receiving straw from its delivery end, means for pivotally connecting one end of said buncher to said threshing machine, means carried by said threshing machine for supporting the other end of said thresher against downward movement to permit free upward movement, and means for dumping said buncher, said buncher being provided with downwardly and rearwardly extending runners supported normally between the ground surface and the bottom of said buncher.

9. A buncher attachment for receiving straw from portable threshing machines, comprising spaced side members, a front member and an open bottom, a flexible bottom member for closing said opening, means for latching said flexible bottom member in a closed position, the forward edge of said flexible bottom member being adapted to be released and moved rearwardly as it engages the ground surface, a roller supported by pivot arms adapted to return the flexible bottom to its original position by a swinging movement of said arms, means actuated by said arms comprising a rotatively mounted shaft, a sheave on each end of said shaft, a cable carried by each of said sheaves, each cable having its free end connected to the corresponding one of said arms, a continuously driven member, manually controlled means actuated by said continuously driven member for setting into operation said shaft, and means for automatically throwing out of operation said mechanism when the flexible member has been returned to its closed position.

10. A bunching device, comprising a container having an open bottom and a flexible bottom member for closing said opening, means for releasing the forward edge of said flexible bottom member to permit it to roll rearwardly by engagement with the ground surface as the buncher is advanced, a pair of swinging arms having their free ends provided with a roller for returning said flexible bottom to its closed position as said arms are swung on their pivot centers, means

for operating said arms, comprising a rotatively mounted shaft, a sheave on each end of said shaft, a cable connected to each of said sheaves, each cable having its free end connected to a corresponding one of said arms, a continuously driven shaft, a sprocket wheel for said continuously driven shaft, a sprocket wheel for the first said shaft, a chain connecting said sprockets, the last said sprocket having a clutch member and a ratchet, a coacting clutch member feathered to the first said shaft, a lever for actuating the last said clutch member, means for yieldably moving said clutch member into engagement, a latch device for retaining said clutch operating lever in an open position, a disk rotatively mounted to the first said shaft having a pawl to engage said ratchet, a cam carried by said disk for engaging said latch device and releasing it from the clutch operating lever, a trip device for normally retaining said pawl in an inoperative position, said trip device being actuated by movement of mechanism for retaining said flexible bottom in a closed position to release said bottom, a cam carried by one of said sheaves, and a link actuated by said cam for moving said movable clutch member to an open position.

11. A buncher for receiving material from the delivery end of a portable threshing machine, comprising spaced side members, a front member and an open bottom, a flexible member for closing said bottom, means for latching and releasing one edge of said flexible member, means for returning said flexible member to a closed position, and a division plate pivotally connected between the side members to move toward and from the receiving end of said buncher.

12. A buncher for receiving material from the delivery end of a portable threshing machine, comprising spaced side members, a front member and an open bottom, a flexible member for closing said bottom, means for latching and releasing one edge of said flexible member, means for returning said flexible member to a closed position, a division plate pivotally connected between the side members to move toward and from the receiving end of said buncher, and means supported adjacent to said division plate when in one of its extreme positions of movement for feeding material to said buncher and adjacent to said division plate under compression.

13. In combination, a combined harvester and thresher, a buncher supported adjacent to the delivery end of said thresher to receive material therefrom, means for compressing and delivering material into the buncher, said means including a yieldable plate, means for dumping unbound bunches of material from the buncher to the ground surface under compression, and means actuated by the move-

ment of said plate for setting said dumping mechanism into operation.

14. A buncher for receiving material from the delivery end of a portable threshing machine, comprising spaced side members, a front member and an open bottom, a flexible member for closing said bottom, means for latching and releasing one edge of said flexible member, means for returning said flexible member to a closed position, a division plate pivotally connected between the side members to move toward and from the receiving end of said buncher, and means actuated by the movement of said division plate to a predetermined position for releasing said latching means.

15. A buncher for receiving material from the delivery end of a portable threshing machine, comprising spaced side members, a front member and an open bottom, a flexible member for closing said bottom, means for latching and releasing one edge of said flexible member, means for returning said flexible member to a closed position, a division plate pivotally connected between the side members to move toward and from the receiving end of said buncher, means actuated by the movement of said division plate to a predetermined position for releasing said latching means, and manually controlled means for releasing said latching means independently of the first said latch releasing means.

16. In combination, a portable threshing machine having a straw conveyor and cleaning riddles, a buncher supported to receive material from the delivery end of said thresher, the outer end of said buncher being adapted to receive straw from the conveyor, and the inner end of said buncher adapted to receive chaff and the like from the riddles, a division plate mounted to move from the outer end of said buncher to its inner end as the buncher is filled to protect the outer ends of said riddles.

17. The combination of a portable threshing machine having a straw conveyor, a buncher supported to receive material from the delivery end of said conveyor, said buncher comprising spaced side members, a front member and an open bottom, a flexible member for closing said bottom, said flexible member having one end attached to the lower edge of said front member, means for latching the other end of said flexible member to the rear end of said side members, means for releasing said latching means, and means for returning said flexible member to a closed position.

18. In combination, a combined harvester and thresher having a straw conveyor at its rear end, a buncher supported beneath the delivery end of said straw conveyor, a releasable bottom for said buncher, a yieldably mounted division plate adapted to travel from

the rear end of said buncher toward its forward end, means for delivering material from the rear end of said conveyor to the rear end of said buncher and against said plate under slight compression, and means for releasing the bottom of said buncher when the plate has been moved to a predetermined forward position.

De Moines, Iowa, January 15, 1929.

ALFRED J. BREEDEN.