C. R. RANEY.

GRAIN BINDER.

APPLICATION FILED DEC. 8, 1913.

1,237,695.

Patented Aug. 21, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

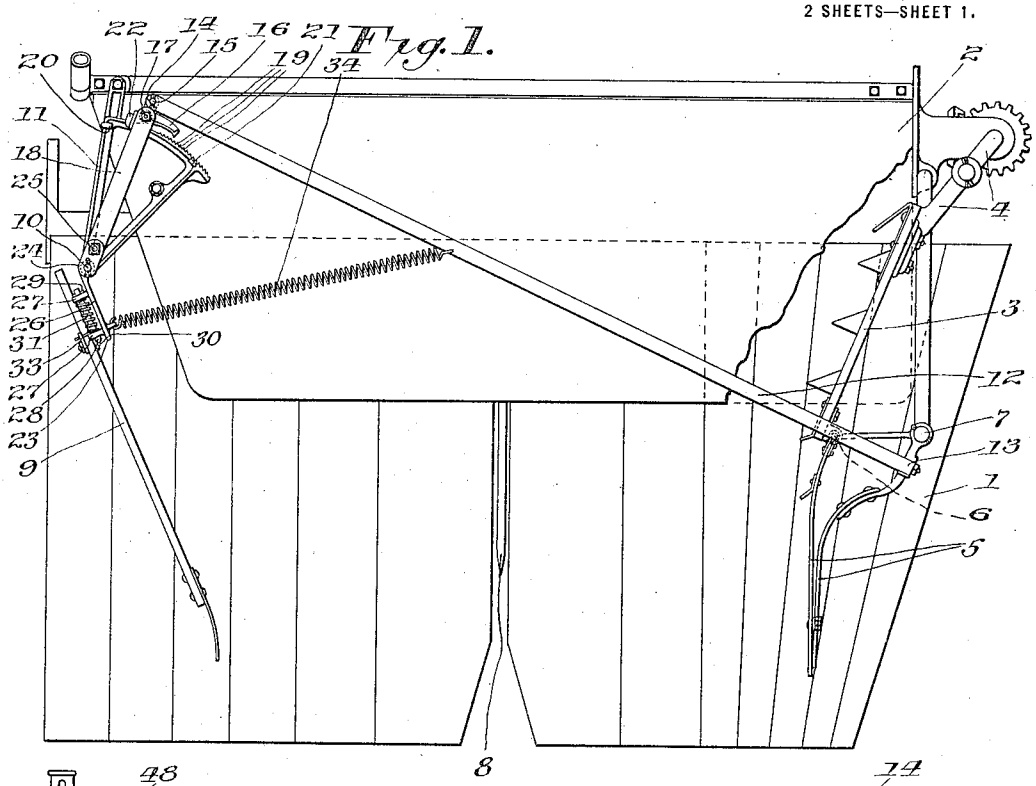


Fig. 5.

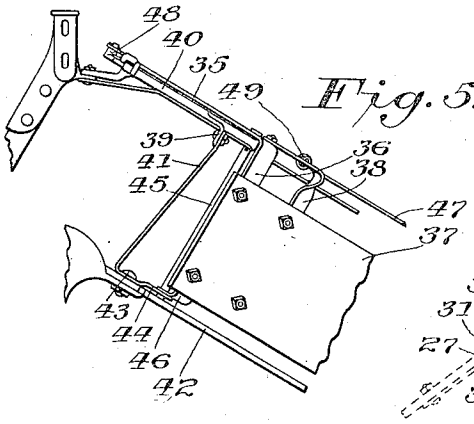
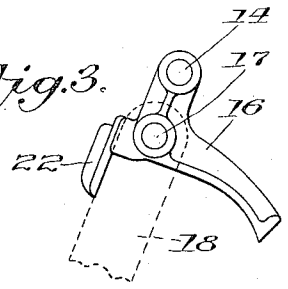


Fig. 3.



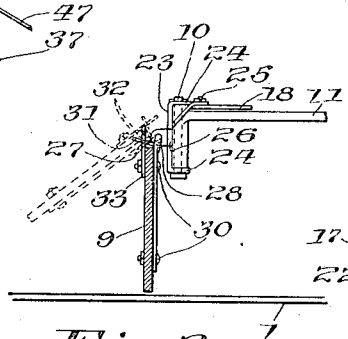


Fig. 2.

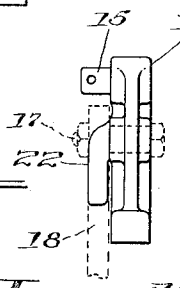


Fig. 4.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 6.

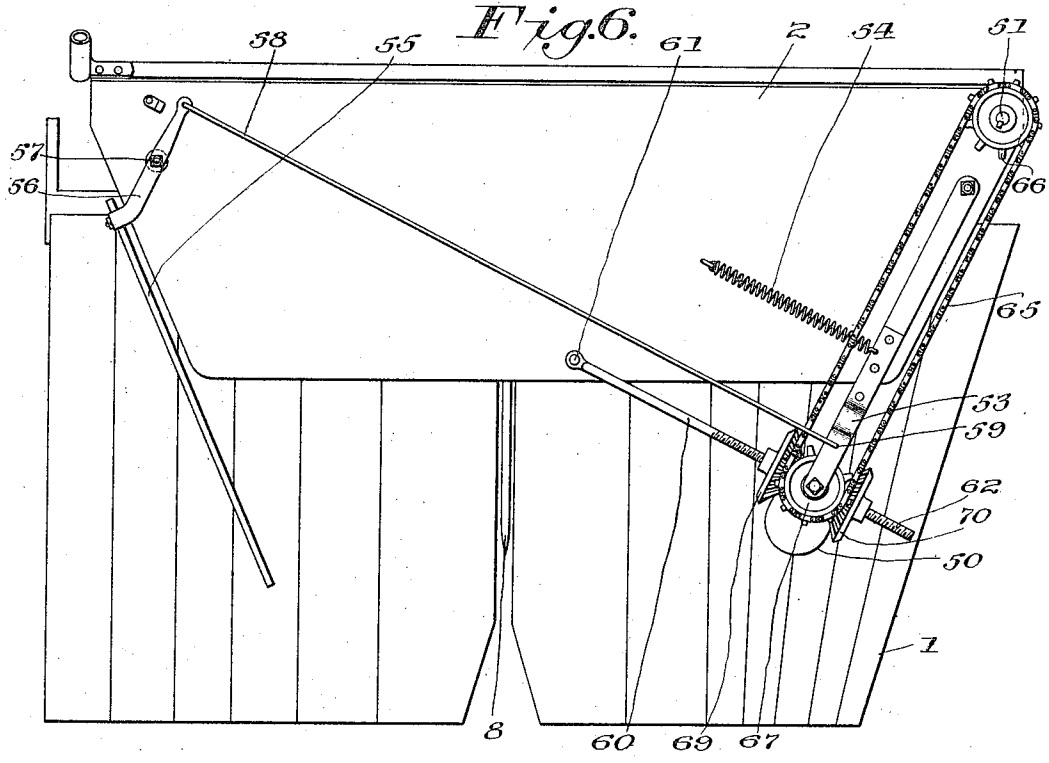
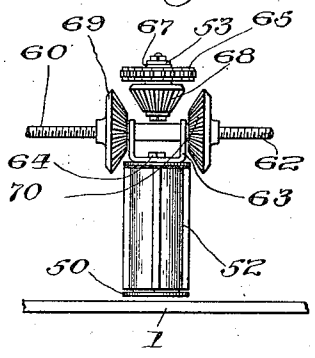


Fig. 7.



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UNITED STATES PATENT OFFICE.

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GRAIN-BINDER.

1,237,695. Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed December 8, 1913. Serial No. 805,230.

To all whom it may concern:

Be it known that I, CLEMMA R. RANEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Binders, of which the following is a full, clear, and exact specification.

My invention relates to grain binders.

It has among its objects to make compact sheaves having square butts and their bands so positioned that the sheaves are well adapted to stand in shocks in the field and withstand handling. A further object of my invention is to make such sheaves automatically in such a manner that the heads, butts and bands of the same are adjusted automatically under varying grain conditions, whether operating in long or short grain, irrespective of the length of the grain and without the necessity for any adjustment on the part of the operator of the binder, such as has been necessary heretofore, the sheaves being automatically formed and the position of the bands thereon being automatically adjusted. I attain these objects by the provision of improved automatic mechanism comprising a buttboard and headboard operatively connected together in an improved manner, and automatically adjusted under all conditions by the grain passing over the binder deck as the length of the same varies, to adjust the heads and butts of grain of different lengths and form therefrom sheaves of a compact character having their bands accurately positioned at the desired point intermediate their ends.

In the accompanying drawings I have illustrated three embodiments which my invention may assume in practice. It is to be understood, however, that the forms shown herein are shown only for purposes of illustration and that my invention is not limited thereto.

Figure 1 is a top plan view of a binder equipped with my improvement;

Fig. 2 is a transverse sectional view of the headboard, showing the same in a plurality of positions;

Fig. 3 is a detail side elevation of the pawl mechanism;

Fig. 4 is a detail end elevation of the latter;

Fig. 5 is a detail side elevation of a modified form of headboard;

Fig. 6 is a top plan view of a modified form of the construction shown in Fig. 1;

Fig. 7 is a detail of the adjustable connecting mechanism shown in Fig. 6.

The construction shown, when broadly considered, comprises a buttboard and a headboard, the buttboard being operatively connected to a moving part of the binder and operatively connected to the headboard in such a manner that the two are automatically maintained in a predetermined relation with respect to the grain passing between them under all conditions irrespective of variation in its length, all changes in position of the head and buttboards being brought about by the grain itself as the latter varies in length.

In Fig. 1 I have illustrated diagrammatically a binder of the usual construction, having a lower binder deck 1 and an upper binder deck 2. In the usual position upon this binder a butter board 3 is mounted. As shown, this butter board is operatively connected to a moving part of the binder through a crank connection 4, the action of the latter being to impart an orbital movement to the butter board in a well-known manner. Carried upon the stubbleward end of this butter board is also a butter extension 5 of well-known construction; this extension being pivoted to the butter board at 6 and to the machine frame through a link 7 in such a manner that as the butter board moves in its orbital movement the extension 5 acts upon the grain after it has been acted upon by the butter.

Carried upon the opposite side of the sheaf binding mechanism 8 from the butter board 3 is a headboard 9. This board is pivotally mounted upon an upstanding pivot 10 journaled in and suitably positioned on the peaked or stubbleward end of a diagonally disposed segmental bracket or casting 11 disposed parallel to the upper deck and fixed thereto at its upper end by any suitable means. As shown, this board 9 is operatively connected to the butter board 3 through a connecting member or rod 12 ex-

tending diagonally across the upper deck and having one end fixed at 13 to the extension 5 on the butter 3; while its other end is pivotally connected at 14 to an upstanding pin 15 formed on a pawl 16, which is in turn pivoted at 17 to an arm 18 extending substantially at right angles to the member 12 and movable with the headboard 9. This pawl 16 coöperates with a series of ratchet teeth 19 formed on the upper edge of the segmental bracket or casting 11 and moves with the butter board between stops 20 and 21 formed on the bracket, a suitable stop or lug 22 being provided upon the member 18 to maintain the pawl normally out of engagement with the teeth 19. As shown in Figs. 1 and 2, the headboard 9 is fixed to the stubbleward end of the arm 18 and normally disposed in a plane substantially at right angles with respect to the binder deck, and at an angle of substantially 45° with respect to the connecting member 12, a resilient connection being provided between the same and a bracket 23 having U-shaped arms 24 fitting over the ends of the pivot pin 10 and its upper arm rigidly attached to the arm 18 at 25. This resilient connection is made to an extension or arm 26 projecting substantially stubblewardly from the rear of the bracket 23 at a point substantially between its U-shaped arms; a plurality of spaced lugs 27 being provided on this extension, in which is journaled an L-shaped holding member 28 positioned by a cotter pin 29. As shown, one arm of this member 28 is flattened to form a reinforcing strap for the headboard, and is bolted to the grain face of the latter at 30, while a coiled spring 31 extends around the other arm of the same between the lugs 27, one end of this spring being positioned against the grainward lug 27, while the other end extends out across the top of the headboard and through one or the other of a plurality of perforations 32 in a supplemental adjusting plate 33 carried on the opposite side of the headboard from the member 28 and secured thereto by one of the bolts 30 holding the latter in position. As shown, the headboard is also operatively connected to the connecting member 12 by a coiled spring 34 operatively connected at one end to the bracket 23 at a point adjacent the lower lug 27 and extending diagonally across the upper deck, where its other end is connected to the member 12 at a point intermediate the ends of the latter and slightly toward the headboard end thereof.

The operation of the construction shown in Figs. 1 to 4 is as follows: When there is no grain passing through the binder the parts will occupy the position shown in Fig. 1, the pawl being then disengaged from the ratchet teeth 21 and both the head and butt boards being unlocked. When grain is passed through the binder, however, due to the pressure of the same on the butter board, the pawl will be thrown into engagement with the ratchet teeth in such a manner as to lock the butter board and cause it to form an effective adjusting agent as it is moved by its operating mechanism, the head board then coöperating with the butter board in adjusting the grain flowing over the deck and being maintained in adjusting position by its connection to the butter board, though free to move outward at any time. When longer grain commences to come over the binder deck from the elevating mechanism, it is, of course acted upon by the butter board in the usual manner. The heads of this longer grain, however, strike the head board 9 and force the same outward with the result that the pawl 16 is automatically disengaged from the ratchet teeth and the butter board is also freed. Obviously, when this occurs, since both the head and butter board are free, they will separate to enable the longer grain to pass between the same, the butter board throwing the pawl into locking engagement with the ratchet teeth and the head board releasing the same alternately as the pressure varies in such a manner as to insure efficient adjusting and proper placing of the band. It is thus seen that the headboard moves outward with a step by step movement as the butter board moves outward, and the pawl travels over the teeth 19, the boards yielding and forming substantial abutments alternately in such a manner as to accommodate the different lengths of grain and cooperating to maintain a predetermined relation to the butts and heads of the grain despite variations in the length of the latter. In other words, the headboard moves outward as the butterboard moves outward until the two boards conform to the increased length of grain, at which time they continue to coöperate to force together the heads and butts of the grain between them, in a manner heretofore described, the butter board being locked and the sheaves being automatically adjusted with respect to the binder deck and binding needle by both the head and butter board in such a manner that their bands are always accurately positioned thereon at the desired distance from the butt irrespective of variations in the length of grain. Obviously, should the grain be too long to be handled by the headboard 9; as, for instance, when working in long grain, such as rye, Kafir corn or the like, this board will, after it reaches its ordinary rearward limit of movement when subjected to an additional pressure determined by the position of the spring 31, also swing upward about its pivot on the member 28, allowing the grain to protrude under it, and, conversely, when shorter grain is again sup-

plied, will be moved downward by the spring to the position shown in full lines in Fig. 2. It is also clearly apparent that when the grain becomes still shorter, the spring 34 will act immediately to withdraw the headboard 9 toward its original or normal position shown in Fig. 1, swinging the arm 18 backward about its pivot without allowing the pawl 16 to engage until it again occupies the proper position for acting upon the grain then coming through the binder when it is again thrown in by the pressure on the butter board. It is also to be noted that when the headboard comes back, the butter board will also be brought in and that the two will continue to act in unison, moving toward or from each other as the grain varies in length, always pressing in the heads and the butts of the grain automatically, regardless of the length of the grain, and being actuated by the grain as it varies to effect their adjustment.

In Fig. 5 I have illustrated a modified form of the construction shown in Fig. 1, wherein, instead of using a headboard, which is free to move upward independently of the arm 18 connecting it to the buttboard, I have illustrated a rigid headboard, the construction being modified accordingly. As shown, the arm 35 in this construction also forms a strap 36 supporting the headboard 37, the latter being also connected to the member 36 by a spaced supplemental strap 38 in such a manner as to form a rigid construction only movable with the arm. Further, as shown in this construction, a depending lug 39 is formed on the ratchet or bracket member 40, to which is connected a downwardly extending strap 41 extending to the lower deck 42, to which it is bolted by a bolt 43 and adjacent which bolt it is provided with an extension 44, which acts as a support for the lower end of the pivot pin 45, coöperating with an inturned lip 46 on the lower end of the member 35 in forming a bearing for this member. As in the previous construction, the upper end of the pin 45 is journaled in the ratchet member 40, and a connecting rod 47 is connected between a pawl 48 and the butter board, a spring 49 being interposed between the same. The operation of this construction will obviously be the same as that shown in Figs. 1 to 4, with the exception that the board 9 will not swing outward when it reaches the limit of its travel.

In Figs. 6 and 7 I have illustrated a still further modified construction, wherein, instead of being used in connection with a butter board, my invention is adapted to use in connection with a gear drive butter of the endless apron type. In this construction the butter frame 50 is pivoted as usual at 51 on the binder frame and the apron 52 thereof is driven from a moving part of the binder, a strap 53 pivoted on the frame extending beyond the end of the apron and connected to the upper binder deck by a diagonally disposed spring 54, tending to maintain the same in its uppermost position. As shown, a headboard 55 in this construction is pivoted to the deck, being connected to the stubbleward end of an arm 56 pivoted intermediate its ends to the deck at 57 and disposed at an angle of slightly over 90° with respect to the headboard. The upper grainward end of this arm 56 is pivotally connected to a diagonally disposed link or rod 58, which, as in the case of the connecting member or rod 12 heretofore described, is connected at its lower end to the butter, in this instance, however, being pivoted to the strap 53 at 59. In order that the headboard and butter may be automatically operated in this construction, I employ a threaded rod 60 pivotally connected at 61 to the deck and extending downward and forward substantially parallel to the rod 58. As shown, the front end of this rod 60 is threaded for a substantial distance, as shown at 62, and the rod is connected through a U-shaped bracket 63 with the butter, the latter being in turn pivotally connected between the arms of the U as shown at 64 in such a manner as to permit it to move freely. Motion is transmitted to this butter mechanism, and therefore to the headboard, by means of a chain 65 operatively connected between a sprocket 66, operatively connected to the driving mechanism for the butter, and coöperating sprocket 67 journaled in the stubbleward end of the strap 53, a beveled gear 68 being journaled with the sprocket 67 upon the stubbleward end of the strap 53 and in a plane above the butter 52 and the threaded rod 60. This beveled gear 68 coöperates alternately with a plurality of preferably rigidly connected spaced beveled gears 69 and 70 carried upon the rod 60 on opposite sides of the U-shaped member 63, acting to connect the butter and headboard adjusting mechanism to the operating mechanism of the former when the pressure on the spring 54 exceeds a predetermined amount. Obviously, the remaining operation of this construction will be substantially the same as that described in connection with Figs. 1 to 5, the beveled gear 67 being alternately thrown into engagement to shift the headboard and butter automatically in accordance with the variations in length of the grain.

It is to be noted that in my improvement the action of the head board and butter is entirely automatic, the parts being adjusted and locked and unlocked by the grain itself as the grain varies in length regardless of whether or not the machine is working on a side hill and without it being necessary for any sheaves to be properly adjusted or for the operator to pay any attention what-

soever to their position or adjust them by means of an adjusting lever.

It is further to be noted that not only do the boards adjust themselves in their outward movement to handle long grain, but that they are also automatically returned to their inner grain handling positions, wherein the headboard normally acts as an abutment coöperating with the butter. Attention is also directed to the fact that should it be desired to use the device in connection with excessively long grain, such as Kafir corn or the like, in the form of my invention shown in Fig. 1, the headboard is also automatically swung upward by this grain without the necessity for attention on the part of the operator.

While I have in this application specifically described three forms of my invention, it is to be understood that I intend to include within the scope of this case such other modifications of the embodiments chosen for purposes of illustration as will be apparent to those skilled in the art and fall within the spirit of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is:

1. In combination, a binder deck, and automatically adjustable self locking and unlocking means controlled by the length of the grain and independent of the binding mechanism for adjusting thereon grain of varying length by action upon the heads and butts thereof.

2. In combination, a binder deck, and automatically adjustable self locking and unlocking means releasable by the heads of the grain thereon automatically adjusting the heads and butts of the grain toward each other.

3. In combination, a binder deck, adjusting members thereon for longitudinally adjusting the grain on the deck by action upon the heads and butts thereof, and means constantly retaining said members in adjusting relation to the heads and butts of grain passing over said deck operatively connected to said members and releasable by the grain and controlled by the length of said grain.

4. In a grain adjusting mechanism for binders, a butt adjusting member, a head adjusting member, and means whereby said butt adjusting member is normally maintained against outward movement operatively connected thereto and controlled by the grain pressure on said head adjusting member.

5. In a grain adjusting mechanism for binders, a butt adjusting member, a head adjusting member, and means whereby said butt adjusting member is locked against outward movement releasable by said head adjusting member upon an increase in grain pressure thereon.

6. In a grain adjusting mechanism for binders, a butt adjusting member, a head adjusting member, means for locking the butt adjusting member against outward movement, and means for unlocking the same operable by an increase in grain pressure.

7. In a grain adjusting mechanism for binders, a butt adjusting member, a head adjusting member, means for locking the butt adjusting member against outward movement, and means for unlocking the same operable by an increase in grain pressure upon said head adjusting member.

8. In a sheaf forming mechanism for binders, a freely movable head positioning member, a butt positioning member, and operative connections between the same controlled by said head positioning member releasable by the pressure of the grain and independent of the binding mechanism for maintaining said members in a predetermined relation to the heads and butts of the grain irrespective of the variations in the length of the grain.

9. In a sheaf forming mechanism for binders, a head adjusting member, a butt adjusting member, and operative connections between the same normally maintaining them in a predetermined relation and automatically releasable by the grain pressure and operable independent of the binding mechanism to move said members toward or from each other without disturbing said relation as the pressure on said head adjusting member decreases or increases.

10. In a sheaf forming mechanism for binders, a head positioning member, a butt positioning member, and operative connections between the same normally maintaining said butt positioning member against outward movement and automatically releasing the same upon an increased pressure upon one of said members.

11. In a sheaf forming mechanism for binders, a head adjusting member, a butt adjusting member, means actuated by butt pressure normally maintaining said butt adjusting member against outward movement, and means for automatically releasing said last mentioned means upon an increase in pressure upon said head adjusting member.

12. In a sheaf forming mechanism for binders, a swinging headboard, a swinging butter, operative connections normally locking said butter board in fixed position with respect to said head board, and means automatically operated upon increased pressure on said headboard releasing said butter.

13. In combination, a binder, a butt positioning member pivoted thereon, a head positioning member likewise pivoted thereon, and ratchet mechanism operatively connected between one of said members and said binder controlled automatically by the other

of said members and actuated upon variation in grain pressure upon the latter.

14. In a sheaf forming mechanism for binders, a head positioning member, a butt positioning member, means operated by the grain normally locking said head positioning member against outward movement, and means automatically actuated upon increased pressure upon said head positioning member coöperating with said butt positioning member to alternately release and lock said locking means as the head positioning member moves outward.

15. In combination, a binder, a butt positioning member pivoted thereon, a head positioning member pivoted thereon, ratchet mechanism operatively connected between one of said members and said binder automatically actuated alternately by said members to move the same apart with a step by step movement, and resilient means normally tending to maintain said members in a predetermined position.

16. In a sheaf forming mechanism, a butter, a headboard, and operative connections between the same automatically operable upon variation in the length of grain supplied between the same to maintain said butter and headboard in a predetermined relation with respect to the grain despite variations in the length of the latter or increased pressure on said butter.

17. In combination, a binder, a head positioning member pivotally mounted thereon, a butt positioning member pivoted thereon, and operative connections between said members releasable by and operated entirely by the increased pressure upon said head positioning member for moving the free ends of said members away from each other and returning the same to their initial position upon decrease of said pressure.

18. In a grain adjusting mechanism for binders, head and butt adjusting members, and operative connections between the same releasable by the grain and controlled entirely by the length of the grain and normally holding said butt adjusting member against outward movement maintaining the same and said head adjusting member in adjusting relation with grain of varying lengths.

19. In a grain adjusting mechanism for binders, head and butt adjusting members, and operative connections between the same normally holding said butt adjusting member against outward movement operable to release said butt adjusting member immediately upon an increase in grain pressure upon said head adjusting member.

20. In a grain adjusting mechanism for binders, head and butt adjusting members, and operative connections between the same whereby said head positioning member is normally maintained in adjusting position and said butt adjusting member is maintained against outward movement releasable immediately upon increased pressure upon said head adjusting member only.

21. In combination, a binder, a butter pivotally mounted thereon, a headboard pivotally mounted thereon having an arm extending grainwardly from its pivot, operative connections between said arm and a point adjacent the stubbleward end of said butter, and resilient means between said operative connections and said headboard normally tending to maintain said butter and headboard in predetermined relation with respect to each other.

22. In combination, a binder, a butter pivotally mounted thereon, a head positioning member pivotally mounted thereon, a rod pivotally connecting the grainward end of one of said members with the stubbleward end of the other, the rod being connected to said members on opposite sides of the pivots of said members, and a spring operatively connected between said head positioning member and a point intermediate the ends of said rod.

23. In combination, a binder, a butter pivotally mounted thereon, a head positioning member pivotally mounted thereon, a rod pivotally connecting the grainward end of one of said members with the stubbleward end of the other, the rod being connected to said members on opposite sides of their pivots, and ratchet mechanism controlling the movement of one of said members in turn automatically controlled by the movement of the other thereof.

24. In combination, a binder, a butter pivotally mounted thereon, a head positioning member pivotally mounted thereon, a rod pivotally connecting the grainward end of one of said members with the stubbleward end of the other, the rod being connected to said members on opposite sides of their pivots, and ratchet mechanism controlling the movement of said head positioning member automatically controlled by said butter as the latter moves about its pivot.

25. In combination, a binder deck, a butter pivotally mounted thereon, a segmental ratchet member carried on the opposite side of said deck frame from said butter, a headboard pivotally mounted on said deck having an arm extending beyond the toothed surface of said member, a pawl pivoted on said arm, a rod pivotally connecting said pawl with the stubbleward end of said butter, and a spring operatively connected between said headboard and said rod.

26. In combination, a binder deck, a butter pivotally mounted thereon, a segmental ratchet member carried on the opposite side of said deck from said butter, a headboard pivotally mounted on said deck having an arm extending beyond the toothed surface

of said ratchet member, a pawl pivoted on said arm, a rod pivotally connecting said pawl and butter, and a spring operatively connected between said headboard and said rod at a point adjacent the headboard end of said rod.

27. In combination, a binder deck, a butter pivotally mounted thereon, a segmental ratchet member carried on the opposite side of said deck from said butter, a headboard pivotally mounted on said ratchet member having an arm extending beyond the toothed surface thereof, a pawl pivoted on said arm, a rod pivotally connecting said pawl and butter, a spring operatively connected between said headboard and said rod at a point adjacent the headboard end of said rod, and a plurality of stops formed on said ratchet member limiting the movement of said headboard arm and the pawl carried thereon.

28. In combination, a binder deck, a butter pivotally mounted thereon, a toothed bracket fixed to the opposite side of said binder deck from said butter, a headboard pivotally mounted on said bracket having an arm extending beyond the toothed surface thereof, a pawl pivoted on said arm engaging the toothed surface of said bracket, means on said bracket limiting the movement of said arm relative thereto, and operative connections between said pawl and said butter controlling the engagement of said pawl with the toothed surface of said bracket.

29. In combination, a binder deck, a butter pivotally mounted thereon, a bracket carried on the opposite side of said binder deck from said butter having an arcuate toothed surface, a headboard pivotally mounted on said bracket having an arm movable through an arc of the same amplitude as the toothed surface of said bracket, a pawl pivotally mounted on said arm, a plurality of stops carried on said bracket limiting the movement of said pawl, means carried on said arm tending to maintain said pawl out of engagement with the toothed surface of said bracket, and operative connections between said pawl and said butter.

30. In combination, a binder deck, a headboard support pivoted thereon, a head-board pivoted on said support on a pivot substantially at right angles to the axis of said support pivot, a butter pivotally mounted on said deck, operative connections between said butter and head-board and controlled entirely by the length of the grain for maintaining the same in predetermined relation with respect to the butts and heads of the grain despite variations in the length of the latter, and a yielding connection between said head-board and its support.

31. In combination, a binder deck, a headboard support pivoted thereon, a head-board pivoted on said support on a pivot substantially at right angles to the axis of said support pivot, a butter pivotally mounted on said deck, operative connections between the same and controlled entirely by the length of the grain for maintaining the same in predetermined relation with respect to the heads and butts of the grain despite variations in the length of the latter, and a resilient connection between said head-board and its support normally maintaining said head-board at right angles to said binder deck.

32. In combination, a binder deck, a headboard support pivoted thereon, a head-board pivoted on said support on a pivot substantially at right angles to the axis of said support pivot, a butter pivotally mounted on said deck, operative connections between the same and controlled entirely by the length of the grain for maintaining the same in predetermined relation with respect to the heads and butts of the grain despite variations in the length of the latter and yielding when the grain exceeds a predetermined length, and a resilient connection between said head-board and its support normally maintaining said head-board at right angles to said binder deck.

33. In combination, a binder deck, a headboard support pivoted thereon, a head-board pivoted on said support on a pivot substantially at right angles to the axis of said support pivot, a butter pivotally mounted on said deck, operative connections between the same and controlled entirely by the length of the grain for maintaining the same in predetermined relation with respect to the heads and butts of the grain despite variations in the length of the latter, and an adjustable resilient connection between said head-board and its support yielding when the grain exceeds one of a plurality of predetermined lengths and normally maintaining said headboard at right angles to said binder deck.

In testimony whereof I affix my signature, in the presence of two witnesses.

CLEMMA R. RANEY.

Witnesses:
RAY PATTISON,
R. W. MARTIN.