

(No Model.)

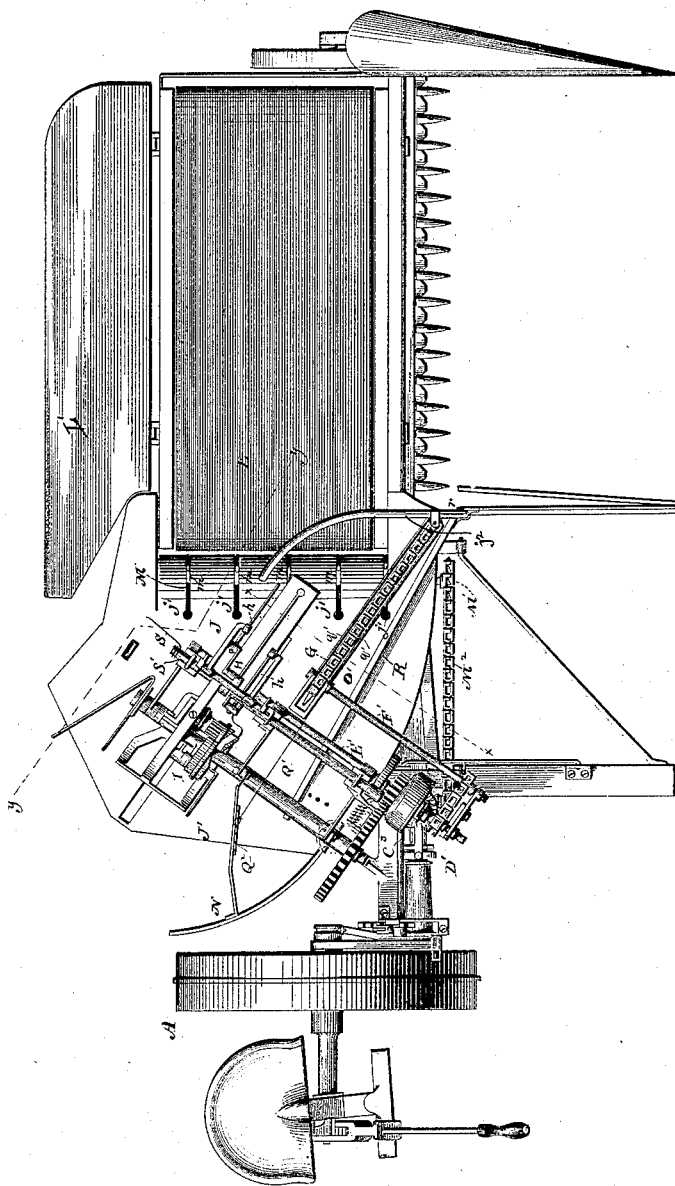
4 Sheets—Sheet 1.

J. F. APPLEBY.

LOW DOWN SELF BINDING HARVESTER.

No. 305,038.

Patented Sept. 16, 1884.



WITNESSES:
R. L. Howes
M. L. Adams.

INVENTOR:
John F. Appleby,
Per Edw. E. Quimby,
Att'y

(No Model.)

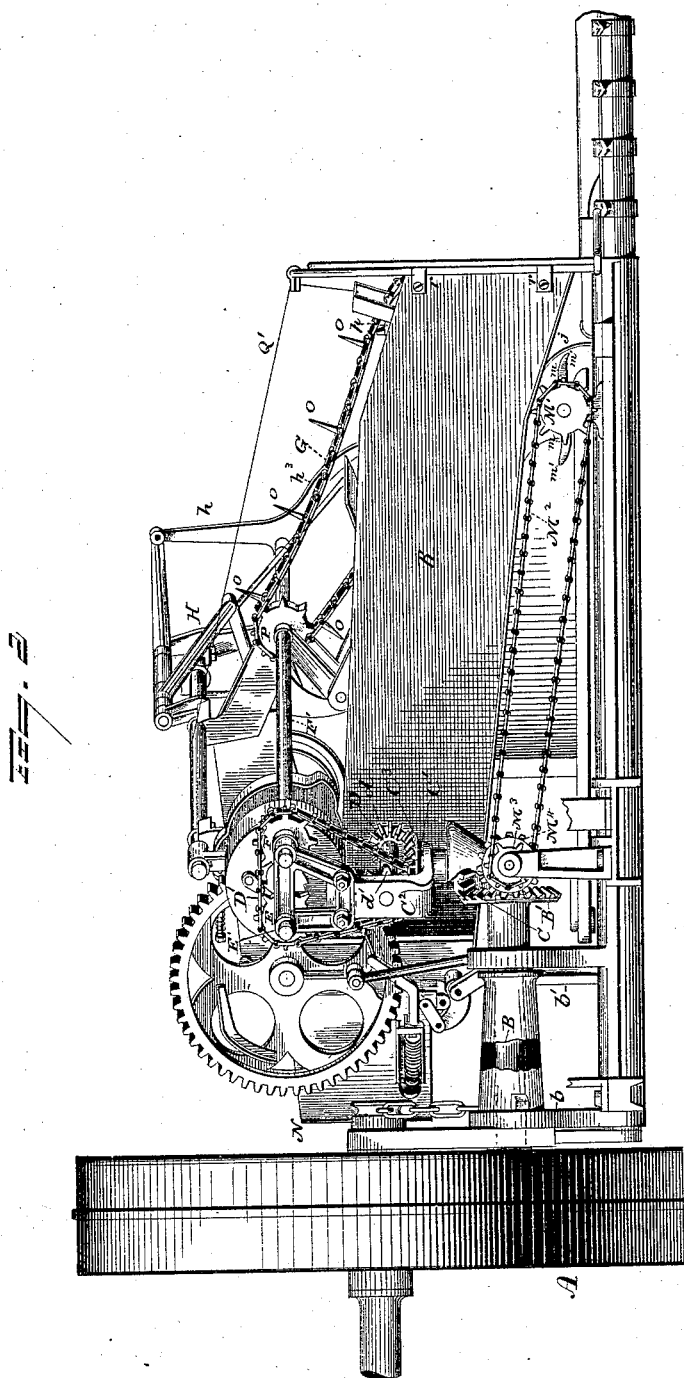
4 Sheets—Sheet 2.

J. F. APPLEBY.

LOW DOWN SELF BINDING HARVESTER.

No. 305,038.

Patented Sept. 16, 1884.



WITNESSES:

R. C. Howel

M. L. Adams.

INVENTOR:

John F. Appleby
Per Edw. E. Lumsby
Atty.

(No Model.)

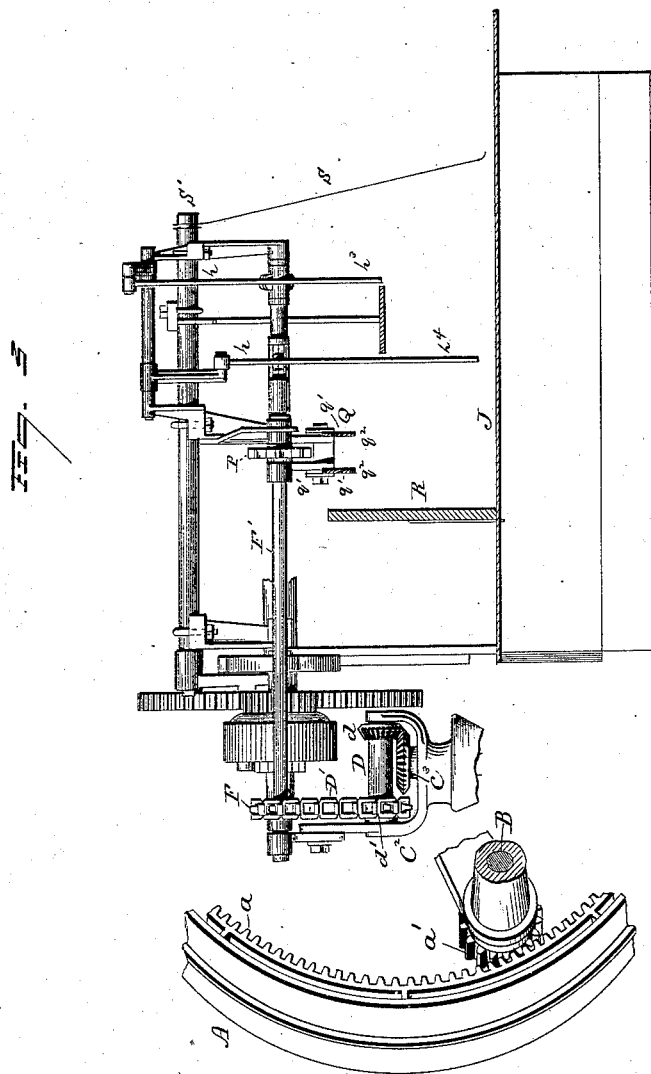
4 Sheets—Sheet 3.

J. F. APPLEBY.

LOW DOWN SELF BINDING HARVESTER.

No. 305,038.

Patented Sept. 16, 1884.



WITNESSES:
R. L. Howe
M. L. Adams.

INVENTOR:
John F. Appleby,
Per Edw. E. Quincy,
Atty.

(No Model.)

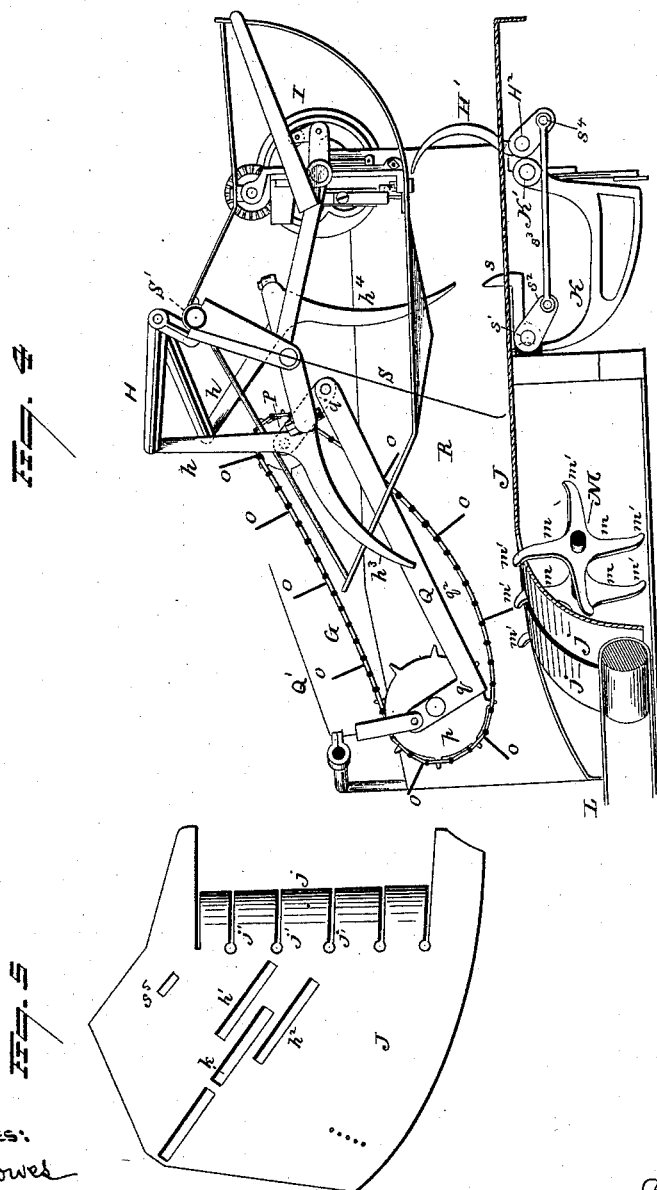
4 Sheets—Sheet 4.

J. F. APPLEBY.

LOW DOWN SELF BINDING HARVESTER.

No. 305,038.

Patented Sept. 16, 1884.



WITNESSES:

R. L. Howe
M. L. Adams.

INVENTOR:

INVENTOR:
John F. Appleby,
Per Edw. C. Quincy,
Atty.

UNITED STATES PATENT OFFICE.

JOHN F. APPLEBY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE MINNEAPOLIS HARVESTER WORKS, OF SAME PLACE.

LOW-DOWN SELF-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 305,038, dated September 16, 1884.

Application filed October 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. APPLEBY, of Minneapolis, Minnesota, have invented certain Improvements in Low-Down Self-Binding Harvesters, of which the following is a specification.

My improvements relate to those low-down self-binding harvesters for cutting and binding grain into bundles and then discharging such bundles upon the ground behind the drive-wheel which employ mechanism for moving the cut grain from the platform in a path which bends toward the rear of the machine, and in which the packing and binding of the grain into bundles is effected by means of packers and a needle or binder arm swinging in vertical planes which are inclined with relation to the vertical plane of the finger-bar.

The distinctive characteristic of my machine is that the axes of the packers and binder-arm are so far inclined backward with relation to the finger-bar as to permit the axes of the drive-wheel and the grain-wheel to be arranged nearly in alignment with each other, with the axial line of the drive-wheel intersecting the side-delivery platform, thereby permitting the cutter-bar to be arranged in line with the front of the machine and affording room on the front part of the machine adjoining the drive-wheel for the erection of the gearing through which power is transmitted from the drive-wheel to the packing and binding mechanisms.

For the purpose of adapting my machine to bind short grain or grain mixed with weeds, I employ a peculiar butt-hastener having a considerable range of action upon the butts, and operating, when required, to accelerate the movements of the butts as the grain comes from the platform, and to thereby swing the stalks of grain around into a position approximating parallelism with the shafts, upon which the packers and binder-arm are respectively mounted.

My machine embodies a peculiar mode of organizing the gearing for transmitting power from the drive-wheel to the packing and binding mechanisms, and also certain adjusting devices employed in connection therewith.

In the machine illustrative of my invention, which is represented in the drawings, the deck of the binder is slightly elevated above the

platform, and the cut grain delivered from the platform-carrier is moved upward along the curved edge of the deck adjoining the platform, and is pushed along the deck toward the packers by a rotating spider-cylinder, the arms of which sweep through slots formed in the curved edge of the deck. To prevent the cut grain from falling over toward the drive-wheel, I employ a curved guide, which extends backward from the front of the machine, at the drive-wheel end of the platform, and then bends downward and sidewise toward the drive-wheel, so that its end serves the further purpose of pressing the flow of cut grain down upon the curved edge of the deck, and thus holding it within the range of movement of the arms of the spider-cylinder. I employ in my machine, at the rear of the platform, a hinged adjustable back board to support the heads of long grain and to prevent short grain from being thrown too far back. I also employ peculiar mechanism for controlling the supporting and compressor arm for holding the grain during the formation of the bundles by the packers, this arm, like that shown and described in Letters Patent of the United States No. 275,114, issued to me April 3, 1883, being rigid during the packing operation, yielding when the binder-arm starts, and being finally freed, so that it can be swung back by the bound bundle when the latter is discharged.

The drawings illustrating a low-down self-binding harvester containing my improvements are as follows:

Figure 1 is a top view of the machine. Fig. 2 is a front elevation of the binder, showing a portion of the cutter-bar. Fig. 3 is a diagonal vertical section taken through the line X X on Fig. 1, showing a part of the drive-wheel, and showing the binder and packer shafts in longitudinal elevation. Fig. 4 is a diagonal vertical section taken through the line Y Y on Fig. 1. Fig. 5 is a top view of the deck of the binder.

The machine represented in the drawings embodies a variety of devices, which I have made subjects of other applications for patents, and which herein require such description only as is necessary to a clear understanding of their relation to the particular features

which are the subject of the present case, the said other applications being No. 109,193, filed October 16, 1883, and No. 111,307, filed November 9, 1883.

5 The machine has an outside drive-wheel, A, provided with the internal gear, *a*, which, meshing into the pinion *a'*, gives motion to the horizontal counter-shaft B, mounted in suitable bearings in the standards *b b'*. The inner
10 end of the counter-shaft B is provided with a bevel-wheel, B', meshing into the beveled pinion C upon the lower end of the vertical shaft C', provided with a suitable bearing in the standard C". The upper end of the vertical
15 shaft C' is provided with the bevel-wheel C', which meshes into the beveled pinion *d*, affixed to the inner end of the diagonally-arranged horizontal counter-shaft D, to the other end of which is affixed the sprocket-wheel *d'*
20 for engaging the chain D', which drives the sprocket-wheels E and F, keyed, respectively, to the gear-shaft E' of the packing and binding mechanism, and the shaft F', for driving the butt-hastener chain G.

25 The organization of the machine by which the power for driving the binding mechanism is taken from the beveled wheel revolving upon a vertical axis permits the horizontal counter-shaft D to be arranged diagonally up-
30 on any desired angle to correspond with the angle at which the packer-shafts and binder-arm shaft are arranged.

The gearing mechanism for automatically effecting the alternate actuation of the pack-
35 ers and binding devices, respectively, is the same as that shown and described in Letters Patent of the United States No. 275,114, issued to me April 3, 1883; but in the present case the packing mechanism H and binding mechanism I are both arranged above the deck
40 J, upon which the gavel rests, and the binder-arm K is mounted upon the rock-shaft K', which is beneath the deck J. The deck J is elevated slightly above the platform-belt L, to allow
45 room underneath for the downward swing of the binder-arm, and is provided with the slot *k*, through which the binder-arm passes in its upward swing. Other slots, *k'* and *k''*, are pro-
50 vided to allow space for the swing of the packer-arms *h*, the end portions, *h'* and *h''*, of which enter the slots *k'* and *k''*, respectively, during the latter portions of their packing movement and push the grain lying upon the deck onward
55 toward the compressor-arm H', which is held rigidly at the commencement of the packing operation, and then maintained in position by a yielding support until the binding operation is completed, when it is freed so it can be
60 rocked out of the way to permit the discharge of the bound sheaf from the machine, as shown and described in Letters Patent of the United States, No. 275,114, issued to me April 3, 1883. The edge of the deck J, adjoining the platform, curves downward, presenting the
65 short rise *j*, provided with the parallel slots *j'*. Immediately under the rise *j* there is arranged a spider-cylinder, M, the radial arms *m* of

which, as the cylinder revolves, successively project through the slots *j'*, and as the direc-
70 tion of their motion is toward the drive-wheel they pick up the grain delivered from the platform-belt and carry it up the rise *j* and propel it along the deck toward the packers. The cut grain is pressed down upon the curved
75 edge or rise *j* by the curved lower end of the guide *j'*. The forward edges, *m'*, of the outer portions of the spider-arms *m* have a slight backward curve in order that they may draw
80 easily out of the mass of grain upon the deck without catching and drawing the stalks down through the slots. The rear edge of the plat-
85 form is provided with the hinged back board, L', capable of adjustment to various elevations, and employed to support the heads of long grain and to prevent short grain from being
thrown too far back.

It will be seen that the vertical planes in which the packer-arms and the binder-arm swing while being, as usual, parallel with each
90 other, are inclined with relation to the planes in which the spider-arms rotate, the latter planes being parallel with the direction of motion of the platform-belt. The direction
95 given, therefore, by these instrumentalities to the moving mass of grain is at first parallel with the finger-bar and then inclined diagonally therefrom toward the rear of the drive-wheel.

To guard against the possibility of the bound sheaves being thrown from the deck against
100 the drive-wheel, the curved vertical shield N is affixed to the front end of the drive-wheel side J' of the deck. This shield, which curves outwardly and backwardly from the front end of the side J' of the deck, effectually prevents
105 the bound sheaves from falling against the drive-wheel.

As an additional expedient for changing the direction of the mass of moving grain, which
110 will be found especially useful in the cases of short grain or of grain mixed with weeds, I employ a butt-hastener consisting, essentially, of the propelling-fingers O, affixed to the links
115 of an endless chain, G, hung upon sprocket-wheels, one of which, P, is affixed to the shaft F', having stationary bearings, while the other,
120 *p*, is pivoted in the free end *q* of the swinging frame Q, the opposite end, *q'*, of which is hung upon the shaft F'. The chain G moves in a vertical plane inclined with relation to the
plane in which the spider-arms rotate.

The free end of the swinging frame Q has attached to it one end of an adjusting-cord, Q', the other end of which is adjustably fastened
125 to the rack Q" on the drive-wheel side of the machine near the driver's seat. The direction of movement of the chain G is such that the propelling-fingers O on the under side of the chain move diagonally from the front end
130 of the rise *j* toward the rear of the drive-wheel. When the free end *q* of the swinging frame Q is lowered sufficiently, which is effected by slacking off the adjusting-cord Q', the propelling-fingers O catch against the butts

of the grain brought up over the rise j by the rotating arms m of the spider-cylinder, and the butts are thus carried onward by the positive action of the fingers O after the stalks have passed beyond the range of movement of the radial arms m of the spider-cylinder. If desired, the speed of rotation of the sprocket-wheels which carry the chain G may be so graduated that the movement of the propelling-fingers O will be more rapid than the movement of the arms m of the spider-cylinder. In either case, as will be seen, the effect produced by the action of the propelling-fingers upon the butts of the grain lying upon the deck is to swing the butts of such grain around toward the rear, and thus arrange the stalks upon the deck in positions approximately parallel with the diagonally-arranged shafts of the packing and binding mechanisms. The chain G , passing from the sprocket-wheel p to the sprocket-wheel P , is carried angularly through the space between the parallel bars $q' q'$ of the swinging frame Q , thereby gradually lifting the propelling-fingers O into the said space and making the lower edges, $q^2 q^2$, of the parallel bars $q' q'$ act as strippers to strip the grain from the propelling-fingers O .

In cutting and binding very light grain, the butt-hastening chain may not be needed, but with heavy grain it is essential, and its capacity of vertical adjustment enables it to be raised to afford clearance for a collection of grain or weeds which may be too thick to pass readily under the chain unless the chain is raised.

Power to rotate the spider-cylinder M is transmitted to the sprocket-wheel M' , affixed to the front end of the spider-cylinder shaft, by the chain M^2 , driven by the sprocket-wheel M^2 affixed to the bevel-wheel M^4 , which meshes into the front side of the bevel-wheel B' .

The front edge of the deck is provided with a laterally-adjustable butt-board, R , set edgewise, and hinged at the end r , adjoining the platform, and provided with suitable appliances for holding it in various positions, as may be desired. The butt-board serves the two purposes of evening the butts of the grain composing the gavel and of gaging the distance from the butts to the place where the binding-cord is applied.

To assist in relatively hastening the movements of the butts, and also to insure an endwise movement of the gavel toward the butt-board, a head-detainer may be employed to hold back the heads of the grain composing the gavel during the packing operation, whereby the resultant effects of the motions of the packers will be the driving of the grain obliquely toward the butt-board, and also the swinging around of the butts. The head-detainer may be a positively-reciprocating finger, s , affixed to a rock-shaft, s^1 , underneath the deck J , and provided with the crank s^2 , operated by means of the connecting-rod s^3 from a shorter crank, s^4 , affixed to the rock-

shaft H^2 of the compressor-arm H' , as shown in Fig. 4. A slot, s^5 , in the deck J admits the finger s , which, as will be seen, projects upward through the slot s^5 in the deck and detains the heads of the grain when the compressor-arm H' is elevated, and is made to drop down out of the way when the compressor-arm H' drops.

Instead of a positively-acting head-detainer, the spring-finger S may be employed. This finger may be affixed to any convenient part of the machine, so that its free end bears down with the force necessary to sufficiently detain the heads of the grain as the gavel is being formed.

In the drawings the spring-finger S is shown as being fastened to the rear end of the horizontal bar S' of the frame which supports the packers. In this position, as will be seen, the finger S may be readily bent to adjust the degree of pressure which it shall exert against the heads of the grain, and consequently the extent to which it detains the heads.

I claim as my invention—

1. In a low-down self-binding harvester, the platform-carrier having its front edge parallel with and forward of the axial line of the drive-wheel, and a system of packers, and a binder-arm vibrating in vertical planes inclined with relation to the line of the cutting apparatus, in combination with a rotating spider-cylinder for continuing the sidewise movement of the mass of cut grain flowing from the platform over the deck of the binder to a point within the range of movement of the said vibrating packers and binder-arm.

2. Mechanism for moving the cut grain, as it is received from the platform-carrier, sidewise to a point on the binder-platform within the range of movement of packers, which vibrate in vertical planes diagonal to the vertical plane of the platform-carrier, in combination with such packers, and a head-detainer for detaining the heads of the grain while the packers are collecting and forming the gavel.

3. The platform-carrier having its front edge parallel with and forward of the axial line of the drive-wheel, the spider-cylinder, for moving the cut grain sidewise over the deck of the binder, and the packers vibrating in vertical planes diagonal to the platform-carrier, in combination with an endless chain provided with outwardly-projecting teeth, and mounted upon suitable rotating sprocket-wheels, by means of which the said teeth are moved successively along the deck of the binder in a diagonal path extending rearwardly from the inner end of the cutter-bar toward the drive-wheel end of the machine, as and for the purpose set forth.

4. The combination, with the swinging packers, of the spring-finger S , for bearing against and detaining the heads of the grain, substantially as and for the purpose set forth.

5. The herein-described vertically-adjustable butt-hastener, consisting, essentially, of the propelling-fingers O , affixed to the endless

chain G, hung upon sprocket-wheels having their bearings in the swinging frame Q.

6. In a low-down self-binding harvester, for transmitting from the drive-wheel the power to actuate the diagonally-arranged shafts of the packing and binding devices, shafting and gearing between the drive-wheel and the packer, and binder-shafting, consisting, essentially, of a horizontal counter-shaft geared to the drive-wheel, and a vertical shaft geared to the said horizontal counter-shaft, and provided with a bevel-wheel for engaging a bevel-pin-

ion upon a diagonally-arranged horizontal counter-shaft geared by means of sprocket-wheels and chains or otherwise to the diagonally-arranged shafts of the packing and binding devices.

7. The shield N, affixed to the front end of the drive-wheel side J' of the deck, as and for the purpose set forth.

JOHN F. APPLEBY.

Witnesses:

E. B. GUMPERT,
R. H. EVANS.