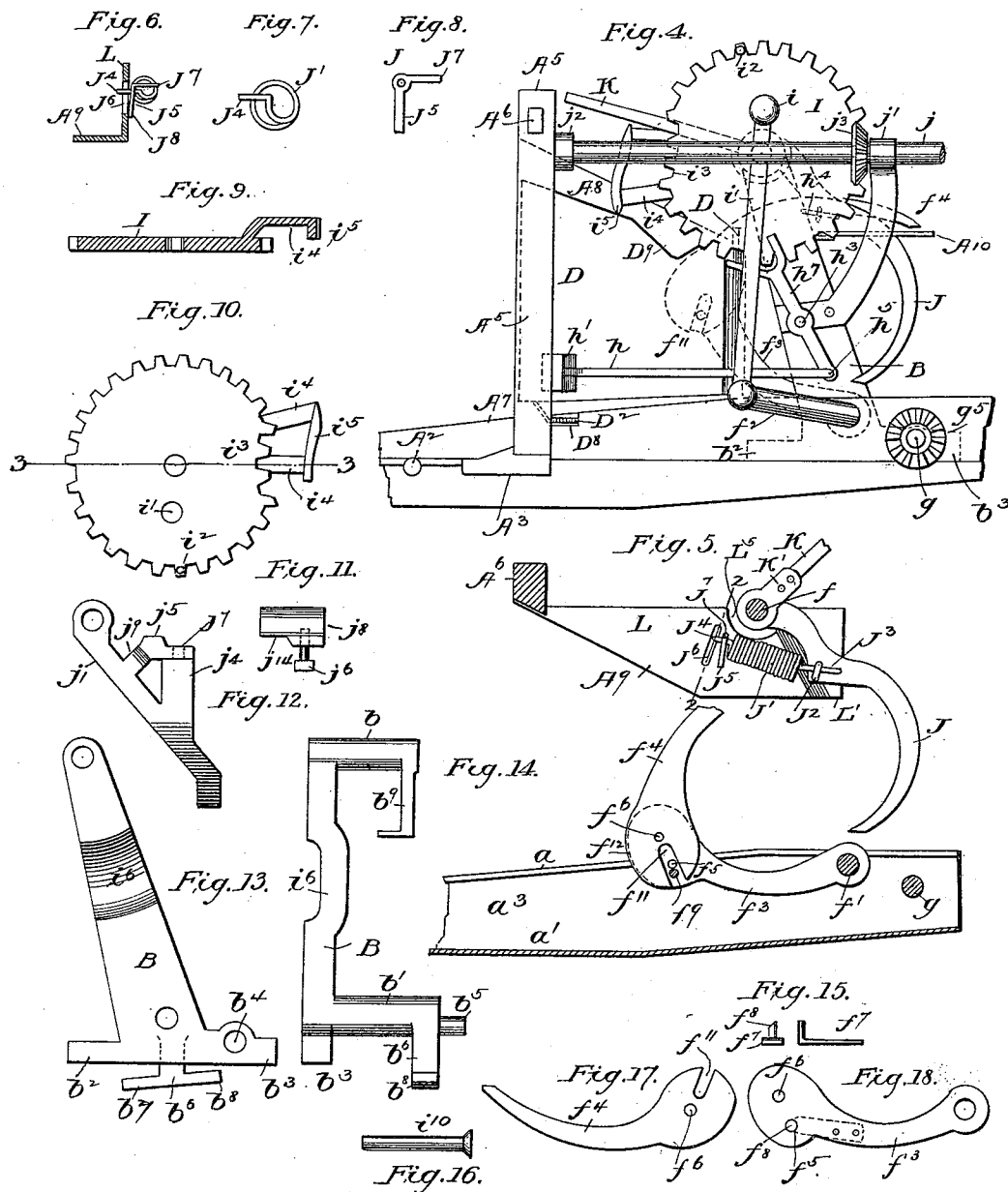


G. SCHUBERT.
GRAIN BINDER.

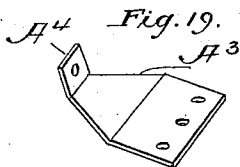
No. 481,974.

Patented Sept. 6, 1892.



Witnesses.

J. A. McCallan
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Inventor:

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UNITED STATES PATENT OFFICE.

GEORGE SCHUBERT, OF WALNUT, TEXAS.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 481,974, dated September 6, 1892.

Application filed July 1, 1891. Serial No. 399,436. (No model.)

To all whom it may concern:

Be it known that I, GEORGE SCHUBERT, a citizen of the United States, residing at Walnut, in the county of Bosque and State of Texas, have invented certain new and useful Improvements in Grain-Binders, of which the following is a specification.

My present invention has reference to a platform-binder in which the needle or cord-carrying arm is placed below the deck of the platform and the cord-tying mechanism is placed above the deck of the platform, and the needle being so arranged as to pass beneath the upper plate of an ordinary platform five or six inches in depth and to receive the grain and to compress the same without the assistance of any packers or specially-operated packing mechanism. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a harvester-platform provided with my improvements. The front breast-plate and a portion of the upper floor of the platform are broken away, so as to show parts below in full lines. Fig. 2 is a front view of the inner portion of the machine. Fig. 3 is a stubble-end view of same. Fig. 4 is a similar view as that of Fig. 2, with the needle elevated. Fig. 5 is a sectional view on line 1 1 of Fig. 1, with the needle partly elevated and with the free joint of the needle locked in position. Fig. 6 is a cross-section of the breast-plate on line 2 2 of Fig. 5, showing the bell-crank, spring, and hook J⁴ in position. Fig. 7 is a detail view of the spring, and Fig. 8 is a detail view of the bell-crank. Fig. 9 is a sectional view on line 3 3 of Fig. 10 of the gear-wheel and its guide. Fig. 10 is a plan view of the gear-wheel and its guide. Fig. 11 is a plan view of a bearing carried by the bracket shown in Fig. 12. Figs. 13 and 14 are plan and side views of the binder-frame to support a part of the gearing. Fig. 15 is a view of the spring and stud to lock the free end of the needle in position. Fig. 16 is a detail view of the shaft carried by the pivoted bearing j⁸. Figs. 17 and 18 are detail views of the needle. Fig. 19 is a perspective view of the shoe, and Fig. 20 is a detail view of the bifurcated end of lever h⁷ and the spring carried by said lever.

Referring to the drawings, A designates the

platform. *a* designates its upper floor, and *a'* its lower floor, braced apart by the strips *a*², *a*³, and *a*⁴, the strip *a*⁴ forming the rearsill of the platform, while the strips *a*² and *a*³ form the walls for the passage-way for the conveyer *g'*. The lower plate *a'* is secured to the lower flange of the finger-bar A', and the upper plate *a* is secured to the upper flange of the finger-bar A'. Said finger-bar A' is provided with the usual guard-fingers A² and an inner shoe A³. Said shoe A³ is provided with a vertical flange A⁴ on its forward projecting end, as shown in Fig. 3. To said flange A⁴ is secured a post A⁵.

A⁶ designates a cross-bar framed to the post A⁵ and extending rearward with its free end a proper distance above the platform, as shown in Figs. 2, 3, and 5. The inner or stubbleward ends of the finger-bar and platform are extended stubbleward a proper distance, so as to provide room for the mechanism hereinafter described. The stubbleward extension of the finger-bar A' is provided with a vertical flange A⁷.

a'' is a flange formed on the front edge of the stubbleward extension of the plate *a* and secured to the vertical flange A⁷.

B designates the binder-frame, provided with projections *b*² and *b*³, by which it is secured to the finger-bar A' and provided with arms or sleeves *b* and *b'*, perforated to receive the shafts *f* and *f'*. The projection *b*³ is perforated at *b*⁴ near its end to provide a bearing for the front end of the shaft *g* to operate the conveyer. The rear end of the said shaft *g* finds its bearing in the strip *a*³. The lower arm *b'* of the binder-frame extends rearward, with its lower half *b*⁵ adjacent the hub of the needle and with its upper half cut away far enough to provide room for the passage of the sprocket-chain *g*³, as shown in Fig. 14, and is provided with a downward-projecting arm *b*⁶ adjacent the front side of the sprocket-chain *g*³, provided with flanges *b*⁷ and *b*⁸, by which the rear end is secured to the lower plate *a'* of the platform. The upper arm *b* extends nearly as far toward the rear as the lower arm *b'*, and is also provided with a downward projection *b*⁹, to which is secured the stubble end of the front breast-plate A⁸. The grain ends of the breast-plates A⁸ and A⁹ are secured to the cross-bar A⁶.

g' designates the conveyer, provided with an upright g^o and operated in the slot g^2 by the chain g^3 , which extends over a sprocket-wheel g^4 , secured to the shaft g near the center of the slot g^2 at the stubble end of the platform. The forward-projecting end of the shaft g is provided with a bevel-pinion g^5 , by which said shaft g receives its motion from gearing of the harvester. (Not shown.) At the grain end of the platform the chain g^8 extends over an idler g^6 , which is secured near the center of the slot g^2 on the shaft g^7 , which has its bearings in the strips a^2 and a^3 , as shown in dotted lines in Fig. 1.

g^{10} designates the grain-board, of ordinary construction, secured to the end of the platform in any suitable manner.

The head of the conveyer g' is cut away or provided with a groove g^8 adjacent the rear side of the chain g^8 and at the stubble end of the block, that it may readily enter below the free end of the needle.

D designates the butt-board, secured at its rear or stubble end to the rod D' , which is pivoted with its lower end in the platform nearly over the projection b^2 of the binder-frame B and with its upper end extending through the front edge of the breast-plate A^8 .

D^2 designates a bell-crank lever pivoted near its angle and with its near arm slightly curved and extending into the passage-way of the conveyer g' , and with its forward-extending arm D^3 connected to near the free end of the butt-board D by the connecting-rod D^4 and staple D^5 . Said bell-crank D^2 is pivoted to the strip a^2 at a proper distance toward the rear or stubbleward, so as to allow its free end to project nearly to the free end of the needle. Said bell-crank D is moved in position, as seen in dotted lines in Fig. 1, by the conveyer g' and drawn back again in position, as seen in full lines by the spring D^6 , which is anchored with its stubble end to the bracket D^7 , which is secured to the finger-bar A^7 and with its other end secured to the arm D^3 . The strip a^2 is cut down to permit the bell-crank to operate beneath the upper plate of the platform. The upright flange A^7 is also cut down at D^8 to permit the arm D^3 and rod D^4 to operate.

I designates a gear-wheel secured to the front end of the shaft f adjacent the binder-frame B, which is provided with a wrist-pin i to receive the connecting-rod i' and a depression i^5 and a guide i^5 , secured to the rear of the gear-wheel I by the arms i^4 in position to correspond with the depression i^3 , as shown in Fig. 10, and a pin i^2 near its lower edge when the needle is at rest, as shown.

D^9 is a depression made in the upper edge of the butt-board, and i^6 is a depression made in the binder-frame B, so as to provide room for the rotation of the guide i^5 .

h designates a rod hinged to near the lower and grain end of the butt-board by the hinge h' and pivoted at its stubble end to the lower end of the lever h^7 . Said lever h^7 is pivoted

near its center to the bracket J' abreast the binder-frame B, extending upward and having its upper end bifurcated, as shown, with the arm h^6 bent outward, as shown, so as to allow the pin i^2 to enter when the gear-wheel I is rotated, and provided with a spring h^2 to engage with the pin i^2 and to hold the gear-wheel I in place and start said gear-wheel I, as hereinafter stated.

j designates a shaft, finding a bearing near its grainward end in the post A^5 and provided with a bearing near its other end in the bracket j' , which is secured to the binder-frame B, as shown in Figs. 2 and 3. Said shaft j is provided with a collar j^2 , secured thereto adjacent the stubbleward side of the post A^5 , and a bevel-pinion j^3 , adjacent the grain side of the bracket j' . Said bracket j' is provided with an inner arm j^4 . Said arm j^4 is bent stubbleward at its upper end, forming the projection j^7 .

j^9 is a web connecting the bracket j' with the arm or projection j^7 at j^5 . Said connection is made of sufficient size to form a support or slide for the front or free end of the pivoted bearing j^8 . Said bearing j^8 is pivoted to the projection j^7 by the set-screw j^6 , with the free end j^{14} resting on the slide j^5 .

i^{10} designates a shaft carried by the pivoted bearing j^8 and provided with a pinion in position to engage with the gear-wheel I and having its rearward-projecting end flared or dovetailed, as shown at i^8 , and in position to engage with the guide i^5 and a bevel-pinion i^9 , secured on its forward-projecting end in position to be engaged and disengaged with the bevel-pinion j^3 , as hereinafter described.

f^2 designates a crank formed on the forward-projecting end of the shaft f' . Said crank is in position to receive the lower end of the connecting-rod i' . Said shaft f' projects through the arm b^4 , and to its rearward-projecting end and adjacent the projection b^5 is secured the inner or first section f^3 of the normally grainward-extending jointed needle, and near the rear side of the slot g^2 and to the free end of the section f^3 is pivoted the section f^4 of the needle, also projecting grainward when the needle is at rest, as shown in Figs. 1 and 2.

f^5 designates a perforation formed near the lower edge of the section f^3 and slightly in rear of the pivot f^6 .

f^8 designates a stud provided with a spring f^7 , said stud having the lower side of its free end beveled, as shown in Fig. 15, and is projected through the perforation f^5 in the section f^3 , with the flat spring f^7 extending stubbleward and secured to the section f^3 , as shown in dotted lines in Fig. 18.

f^9 designates a bar secured to the strip a^2 and projecting rearward with its free end to near the rear section f^3 of the needle, with its free end rounded to near the same size of that of the stud f^8 and with its upper side beveled and located in line of movement of the stud f^8 , as shown in Fig. 5.

f^{10} designates a block secured to the strip a^2 to additionally secure the bar f^9 .

f^{11} is a slot cut in the inner portion of the heel of the second section f^4 of the needle, as shown in Fig. 17, of sufficient size to allow the free end of the bar f^9 to enter and operate the section f^4 of the needle, as hereinafter described.

f^{12} is a perforation in the point of the needle to receive the usual cord.

f^{14} is a light plate secured on the strip a^2 to strengthen the upper end of the pivot of the bell-crank D^2 and extending to near the binder-frame, with its rear edge projecting partly over the block f^{10} .

J J designate the compressors, each of which is provided with an eye near its upper end, by which the compressor is loosely secured on the shaft f and has its lower end curved to conform with the curvature of the sheaf.

J' J' designate coiled springs, each of which is rigidly secured with one end to a compressor J by a staple J^2 , with the end J^3 entering a small perforation in the compressor. The other end of the spring is bent to one side (to the side of the coil next the breast-plate) and then turned at a right angle toward the breast-plate, so as to enter the slot J^6 in the vertical flange L of the breast-plate A^9 . For the rear compressor the hook J^4 is turned rearward, and for the front compressor the hook J^4 is turned forward toward the breast-plate A^8 . One or more of such compressors can be employed. Two are shown in the drawings.

J^8 designates a bell-crank loosely pivoted on the free end of the coiled spring J' between the end of the coil and the hook J^4 , with the longer arm J^5 extending downward adjacent the vertical flange L, and the arm J^7 projecting horizontally and at a right angle from the flange L and of sufficient length to extend into the path of the discharging-arm K. The discharging-arm K is riveted to the bracket K' , which is rigidly secured to the shaft f , by which the discharging-arm K is rotated. Said discharging-arm K is of ordinary construction and of proper length to discharge the bound sheaf and is placed adjacent the eyes of the compressors J. The vertical flanges L of the breast-plates A^8 and A^9 are cut out at L^5 to clear the shaft f and its fixtures, and having an offset at L' , as shown in Figs. 1 and 5, for the purpose hereinafter described.

L^2 designates a bracket loosely secured on the rear end of the shaft f by the pin L^6 , adjacent the rear compressor J and provided with a flange on the lower end of its downward projection, to which is secured the rear or stubbleward end of the breast-plate A^9 .

A^{10} is a breast-board secured to the stubble end of the breast-plates A^8 and A^9 . The front breast-board for the breast-plate A^8 is shown in dotted lines only in Fig. 1.

The operations are as follows: The mechanism is started by the butt-board D being

moved in position, as seen in dotted lines in Fig. 1, by the conveyer, thereby drawing the rod h grainward, which in turn moves the upper end of the lever h^7 in the opposite direction, thus moving the gear-wheel I forward far enough that the depression i^3 is past the pinion i^7 , thus moving the pinion i^7 outward or stubbleward, which causes the bevel-pinion i^9 to move in the opposite direction and causing it to engage with the bevel-pinion j^3 , thus turning the gear-wheel I until the depression i^3 comes again opposite the pinion i^7 , and the guide i^5 engaging, with the projecting end i^8 of the shaft i^{10} , thus drawing the pinion i^7 inward to the extent of the depression i^3 , and thereby disengaging the bevel-pinion i^9 from the bevel-pinion j^3 , which allows the gear-wheel I to discontinue its rotation until again started by the lever h^7 , as heretofore described. The shaft j receives its motion from gearing of the harvester. (Not shown in the drawings.) The connection of the rod D^4 with the bell-crank D^2 is placed in the line joining the pivots of the bell-crank D^2 and the connection of the rod D^4 to the butt-board D, so that pressure from the rod h will not operate the butt-board. Thus it will be seen that the rod h will hold the gear-wheel I in position until started by said bell-crank. The shaft f' is rocked by the gear-wheel I through the crank f^2 , connecting-rod i' , and wrist-pin i , and the rear section f^3 of the needle being secured to the rock-shaft f' . Said rock-shaft f' will operate the needle as follows: First moving the section f^3 , and the section f^4 , being in engagement with the bar f^9 and pivoted to the section f^3 beyond the bar f^9 , said bar f^9 will cause the section f^4 to move in the position shown in Fig. 5, the two sections being locked in position by the stud f^8 , when the needle is in position to compress the grain and deliver the cord to the knotting mechanism, (not shown in the drawings,) and as the needle retreats the slot f^{11} will again pass down over the bar f^9 , when the bar f^9 will depress the stud f^8 , thus unlocking the section f^4 , when the heel of the section f^4 will pass over it and allow said section to be straightened out, as seen in Fig. 2 in dotted lines, by the bar f^9 operating on the inner side of the slot f^{11} . The discharging-arm K is rotated by the shaft f . The compressor is loosely hinged on the shaft f and held in position by the spring J', the hook J^4 of said spring engaging in the slot J^6 in the breast-plate flange L. Said spring J' is of proper strength to impart to the compressor the proper amount of action or elasticity. The discharging-arm K comes in contact with the arm J^7 of the bell-crank J^8 at about the time the cord-tying operation is far enough advanced to dispense with the compressor, when the arm J^7 will be depressed, and the arm J^5 , resting against the flange L of the breast-plate, will cause the hook J^4 to withdraw from the slot J^6 . Next, the discharging-arm K will move against the grain end of the spring J', and moving it stubbleward, thus moving the compressor

stubbleward and upward, so as to clear the passage for the discharge of the bound sheaf. At the time the sheaf is being discharged the grain end of the spring J' arrives at the depression L' of the vertical flange L, when the spring will move outward toward the depression L', and thus move from under the discharging-arm, and as soon as the discharging-arm has moved out of the way the said spring J' will again be moved grainward by means of the weight of the compressor J until the hook J⁴ again engages the slot J⁶, thus locking the compressor in position for the next operation. The operation of the other or forward compressor and discharging-arm is the same as the ones just described.

Having thus described my invention, its constructions, objects, and uses, and without wishing to be understood as confining my claims of invention to the precise form or proportion of parts herein shown and described, so long as the principles of construction and mode of operation are the same as that herein set forth, what I do claim, and desire to secure by Letters Patent, is—

1. In a grain-binder, the combination of a butt-board and mechanism for moving the same, with a rod *h*, hinged to near the free end of the butt-board and with its other end pivoted to the lower end of the lever *h*⁷, and the lever *h*⁷, pivoted to the binder-frame and having its upper end bifurcated, as shown, and the arm *h*⁶, bent grainward and provided with a spring *h*² to engage with a pin *i*², secured to the gear-wheel I, having a depression *i*³, a guide *i*⁵, and a shaft mounted in a pivoted bearing-block, as shown, and for the purpose described.

2. In a grain-binder, the combination of a butt-board with a rod *h*, hinged to near the free end of the butt-board and with its other end pivoted to the lower end of the lever *h*⁷, and the lever *h*⁷, pivoted to the binder-frame and having its upper end bifurcated, as shown, and the arm *h*⁶, bent grainward and provided with a spring *h*² to engage with a pin *i*², secured to the gear-wheel I, having a depression *i*³, a guide *i*⁵, a shaft mounted in a pivoted bearing-block, a bell-crank D², pivoted in the platform, extending with its free end in the path of the conveyer and connected with its other arm to the butt-board by a connecting-rod D⁴, as shown, and a conveyer operated in the platform, as and for the purpose described.

3. In a grain-binder, the combination of a butt-board with a rod *h*, hinged to near the free end of the butt-board and with its other end pivoted to the lower end of the lever *h*⁷, and the lever *h*⁷, pivoted to the binder-frame and having its upper end bifurcated, as shown, and the arm *h*⁶, bent grainward and provided with a spring *h*² to engage with a pin *i*², secured to the gear-wheel I, having a depression *i*³, a guide *i*⁵, a shaft mounted in a pivoted bearing-block, a conveyer operated in the platform, a bell-crank D², pivoted in the platform, extending with its free end in the

passage-way of the conveyer and connected with its other arm to the butt-board by a connecting-rod D⁴ in position, as shown, and a spring D⁶, secured with one end to a bracket and with its other end to the bell-crank D², for the purpose described.

4. In a grain-binder, the combination, with a gear-wheel I, provided with a depression *i*³, formed in its toothed periphery, a guide *i*⁵, and a pin *i*², as shown, of a shaft *i*¹⁰, provided with a pinion *i*⁷ and a bevel-pinion *i*⁹, said shaft *i*¹⁰ carried by a pivoted bearing *j*⁸, a lever *h*⁷, pivoted to the binder-frame and having its upper end bifurcated, the arm *h*⁶, provided with a spring *h*² to engage with the pin *i*², a rod *h*, connecting the lever *h*⁷ to a butt-board, and a conveyer to operate the butt-board, as shown, and for the purpose described.

5. In a grain-binder, the combination, with a gear-wheel I, provided with a pin *i*² and a depression *i*³, formed in its periphery, and a guide *i*⁵ to correspond with the depression *i*³ and secured to the gear-wheel I, as shown, of a shaft *i*¹⁰, having its rear end *i*⁸ projecting and provided with a pinion *i*⁷ and a bevel-pinion *i*⁹, said shaft *i*¹⁰ being carried by a pivoted bearing *j*⁸, a lever *h*⁷, pivoted to the binder-frame and having its upper end bifurcated, and the arm *h*⁶, provided with a spring *h*² to engage with a pin *i*², a rod *h*, connecting the lower end of the lever *h*⁷ to a butt-board, and a bell-crank pivoted in the platform and connected to the butt-board by a rod D⁴, as shown, and for the purpose described.

6. In a grain-binder, the combination, with a bracket *j*⁷, secured to the frame of the machine and provided with an arm *j*⁴, provided with a flange or projection *j*⁷ and a slide *j*⁵, of a bearing *j*⁸, pivoted to the projection *j*⁷ and with its free end resting on the slide *j*⁵ and provided with a shaft *i*¹⁰, provided with the projection *i*⁸ and a pinion *i*⁷ and a bevel-pinion *i*⁹, and a gear-wheel I, provided with a depression *i*³ and a guide *i*⁵, as shown, and for the purpose described.

7. In a grain-binder, the combination, with a needle formed of sections, the section *f*³, rigidly secured to a rock-shaft *f*¹, and the section *f*⁴, pivoted to the free end of the section *f*³, of a spring-pressed stud *f*⁸, projecting through a perforation *f*⁵ and secured to the section *f*³, a slot *f*¹¹, formed in the heel of the section *f*⁴, and a bar *f*⁹, located in the platform and projecting with its free end rearward, with its free end adjacent the section *f*³ in position to engage in the slot *f*¹¹, for the purpose described.

8. In a grain-binder, the combination, with a needle formed of sections, the section *f*³, rigidly secured to the rock-shaft *f*¹, and the section *f*⁴, pivoted to the free end of the section *f*³, of a perforation *f*⁵ in the section *f*³, located slightly in rear of the pivot *f*⁶, a spring-pin projecting through the perforation *f*⁵, with its projecting end beveled from the lower side, a bar *f*⁹, secured in the platform, projecting

toward the rear, with its free end adjacent the section f^3 and located on line with the movement of the stud f^8 and having its end beveled from its upper side, and a slot f^{11} in the heel of the section f^4 , as shown, and for the purpose described.

9. In a grain-binder, the combination, with a compressor J, formed as shown and pivoted on a shaft f and provided with a coiled spring J' , rigidly secured with its stubble end to the compressor and projecting grainward, with its free and projecting end curved outwardly and bent to form a hook J^4 to engage with the slot J^6 of the breast-plate, of a discharger-arm secured on the shaft f , and a bell-crank lever, as shown, and for the purpose described.

10. In a grain-binder, the combination, with a compressor J, constructed as shown and loosely hinged on the shaft f and provided with a coiled spring J' , rigidly secured with its stubble end to the compressor and projecting grainward, with its free and projecting end curved outwardly and bent to form a hook J^4 to engage with the slot J^6 of the vertical flange L of the breast-plate, of a bell-crank pivoted on the outwardly-curved end of the spring J' adjacent the hook J^4 , with the arm J^5 extending down adjacent the vertical flange

L, with the other arm J^7 projecting in the path of the discharging-arm K, and a discharging-arm rigidly secured on the shaft f adjacent the compressor, as and for the purpose described.

11. In a grain-binder, the combination, with a compressor constructed as shown and loosely hinged on the shaft f and provided with a coiled spring J' , rigidly secured at its stubble end to the compressor and projecting grainward, with its free and projecting end curved outwardly and bent to form a hook J^4 to engage with the slot J^6 of the vertical flange L of the breast-plate, of a bell-crank pivoted on the outwardly-curved end of the spring J' adjacent the hook J^4 , with the arm J^5 extending down adjacent the vertical flange L, with the other arm J^7 projecting in the path of the discharging-arm, a discharging-arm K, rigidly secured to the shaft f adjacent the compressor J, and a depression L' in the vertical flange L of the breast-plate, as and for the purpose described.

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Witnesses:

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