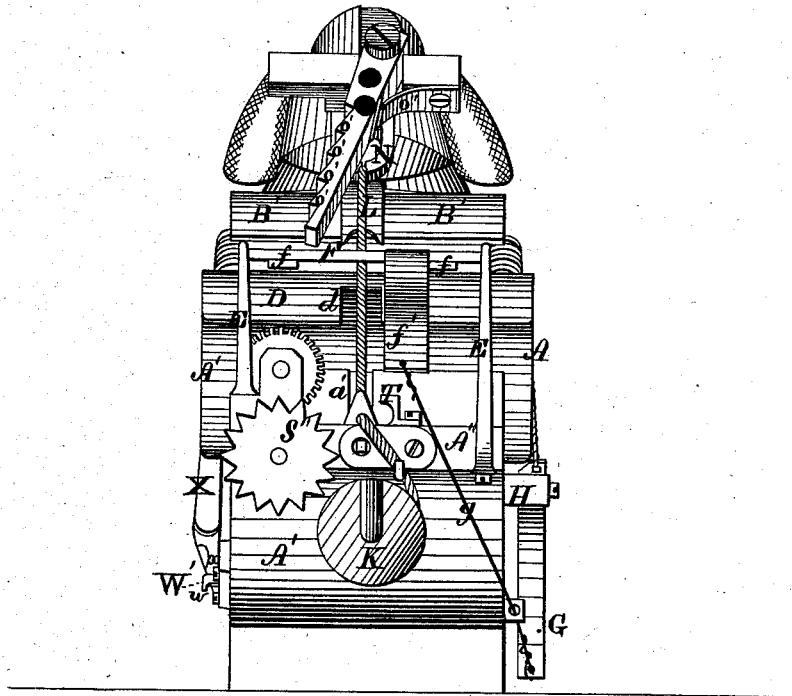


C. F. CARR & S. S. WILCOX.
Grain-Binder.

No. 162,899.

Patented May 4, 1875.

Fig. 1.



WITNESSES=

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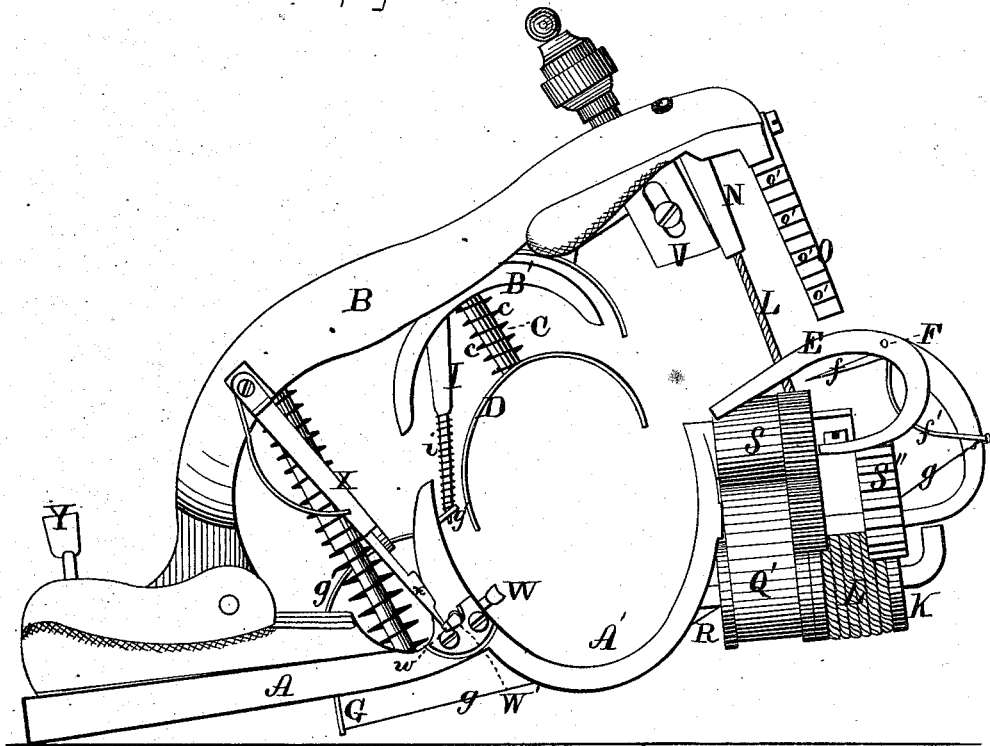
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Fig. 2.



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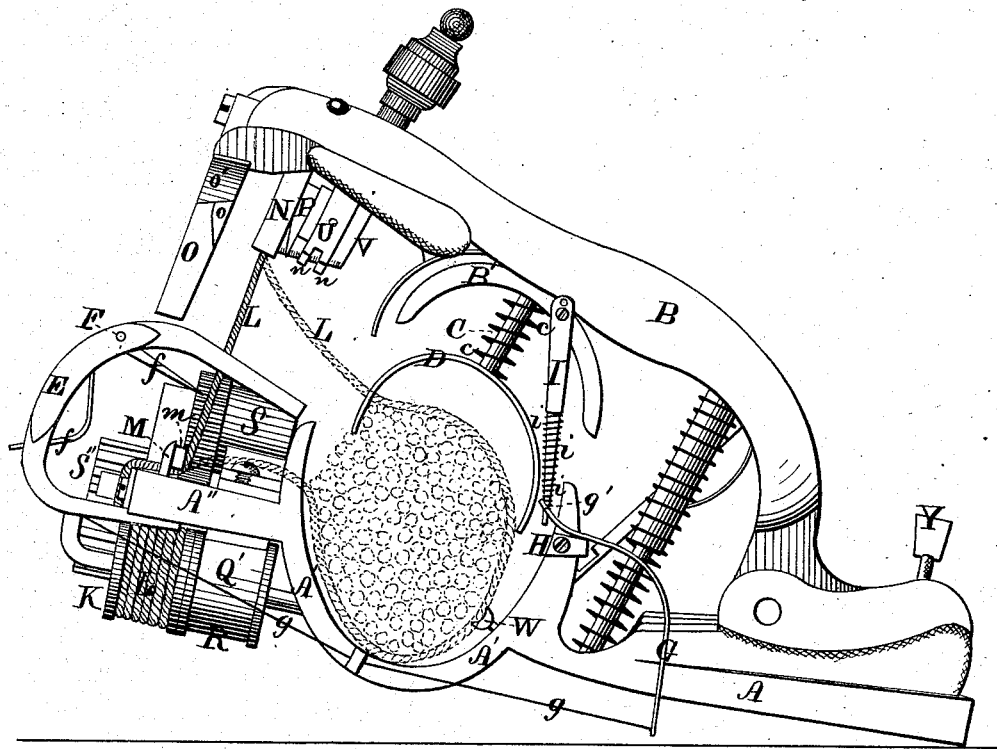
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Fig. 3.



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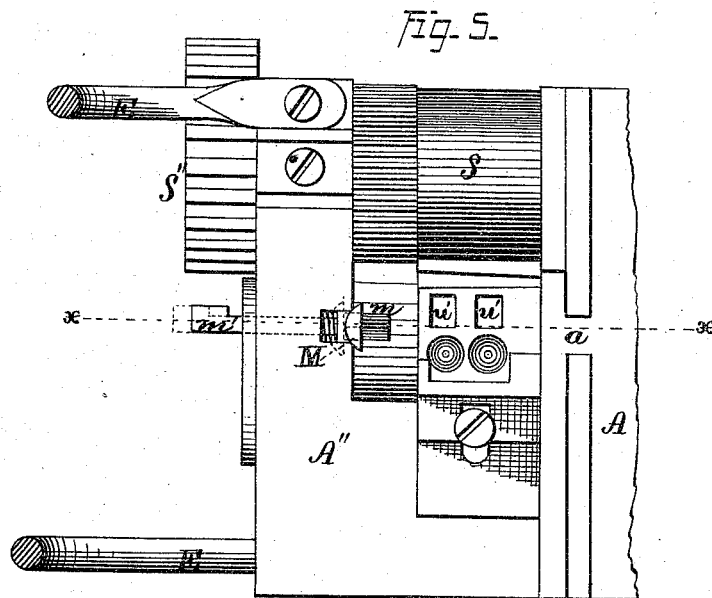
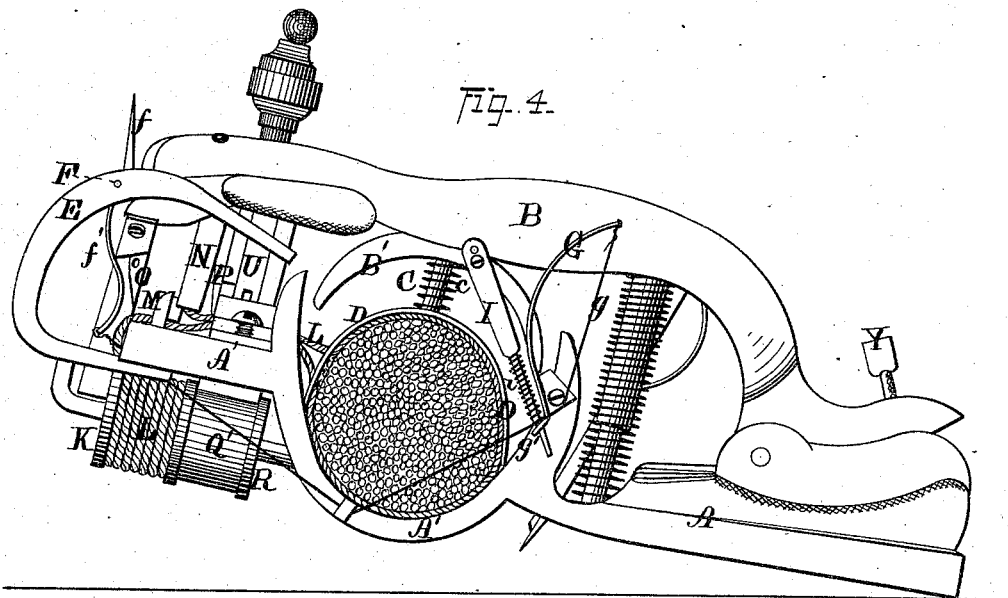
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Fig. 6.

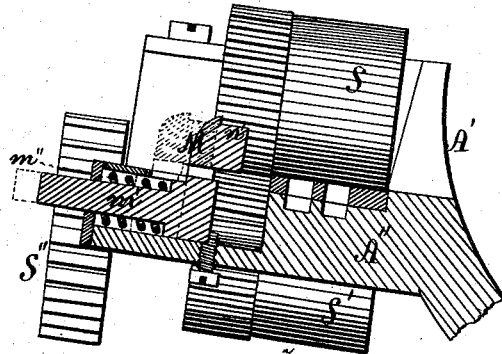


Fig. 7.

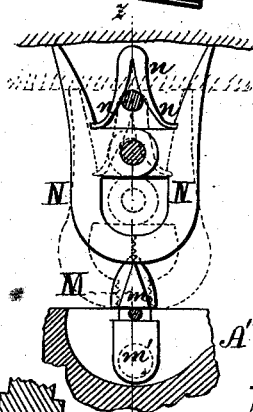


Fig. 8.

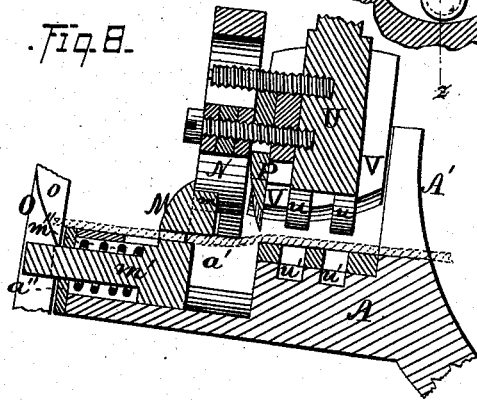


Fig. 9.

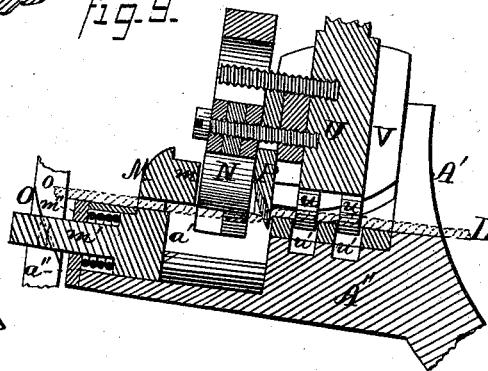
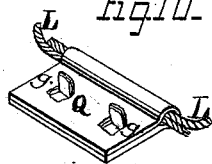


Fig. 10.



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UNITED STATES PATENT OFFICE.

CHARLES F. CARR AND STEPHEN S. WILCOX, OF ADEL, IOWA.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. 162,899, dated May 4, 1875; application filed March 15, 1875.

To all whom it may concern:

Be it known that we, C. F. CARR and STEPHEN S. WILCOX, of Adel, in the county of Dallas and in the State of Iowa, have invented certain new and useful Improvements in Grain-Binders; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is an elevation of the front end of our improved mechanism. Figs. 2 and 3 are like views of opposite sides of the same. Fig. 4 is a side elevation of said mechanism, showing the position of parts when a sheaf of grain is nearly compressed and ready for binding. Fig. 5 is an enlarged plan view of the upper side of the lower portion of the binding devices. Fig. 6 is a section of the same upon line *x x* of Fig. 5. Fig. 7 is an elevation of the inner sides of the devices employed for picking up and severing the binding-cord. Figs. 8 and 9 are vertical sections of the same upon line *z z* of Fig. 7, showing, respectively, the position of the jaws before and after they have grasped said cord. Fig. 10 is a perspective view of the fastening or tie employed for confining the ends of the binding-cord.

Letters of like name and kind refer to like parts in each of the figures.

The design of our invention is to render practicable the automatic binding of grain by machinery; and it consists principally in the means employed for arresting the passage of grain to the machine during the operation of binding a gavel, substantially as is hereinafter shown. It consists, further, in the means employed for passing the confining-cord around the grain, substantially as is hereinafter set forth. It consists, further, in the means employed for operating the pick-up jaws, substantially as and for the purpose hereinafter shown and described. It consists, further, in the means employed for severing the confining-cord, substantially as and for the purpose hereinafter specified. It consists, further, in the means employed for forming and securing the metal clip or clasp in place upon the binding-cord, substantially as and for the purpose hereinafter shown. It consists, further, in the means employed for feeding the metal ribbon

beneath the forming-dies, substantially as and for the purpose hereinafter set forth. It consists, further, in the means employed for removing the bound grain from the machine, substantially as is hereinafter shown and described. It consists, further, in the means employed for limiting the motion of the pivoted binding-arm, substantially as and for the purpose hereinafter specified.

In the annexed drawings, A represents the base of our machine, constructed preferably of metal, in the form shown, its central portion being provided with a transverse half-round cavity, A', while upon its front end is formed a table, A'', that has substantially the same general plane as said base, and is placed at a point below the upper edge of said recess. To or upon the rear end of the base A is pivoted one end of a lever, B, which has substantially the same length and general width as said base, and is provided upon its lower side with a semicircular plate, B', that corresponds in shape and size to, and coincides with, the cavity A'. From the lower side and center, at each end of the plate B', projects downward a stud, C, that serves as a guide for, and upon which a curved plate, D, slides vertically, the lower ends of said studs being enlarged, so as to prevent said plate from becoming disengaged therefrom. A spiral spring, *e*, is placed around each stud C, and, extending between the plates B' and D, press the latter downward to its farthest limit. The lever B is arranged to rise sufficiently to enable grain-stalks to pass between the forward lower edge of the plate D and the corresponding edge of the cavity A', suitable guides E and E being arranged above the table A'' to support said grain while passing over the same.

When a sufficient quantity of grain has passed into the holder A', by depressing the outer end of the lever B the stalks of said grain will be compressed and caused to assume the form shown in Figs. 3 and 4, so as to enable them to be bound by the mechanism hereinafter described.

The lever B being arranged so as to move downward to the same point each time, the varying sizes of the gavels of grain would render uniform compression impracticable were it not for the plate D, which is placed at such a

distance below the plate B' as to bear upon the smallest gavel, while when larger gavels are received said plate D will yield as much as may be necessary for their accommodation. In order that the inward passage of grain may be arrested while each gavel is being compressed and bound, a shaft, F, is journaled within, and extends between the guides E and E, and is provided with two or more teeth, *f* and *f*, that extend radially outward from one side. A spring-arm, *f'*, extends outward from the side of said shaft opposite to said teeth, and is connected by means of a rod, *g*, with one end of a spring-arm, G, that is attached at its opposite end to or upon a block, H, which latter is journaled upon the side of the base A. The inner end *g'* of the spring-arm G extends forward beyond the block H, and is loosely connected with one end of a rod, I, that at its opposite end is pivoted to or upon the lever B, the arrangement being such as to cause the downward motion of said lever to move the spring-arm G rearward and upward, and thereby depress the outer end of the arm *f'*, by which means the teeth *f* and *f* are raised to a vertical position (as shown in Fig. 4) whenever said lever has moved sufficiently. When said lever is raised said parts assume the positions shown in Figs. 2 and 3, said teeth being turned downward below the line of the guides E and E. It is necessary that the teeth *f* and *f* should be turned upward at the instant when the lever B has commenced its downward movement, and should remain in such position until said lever has nearly returned to its normal position, which result is accomplished, first, by so proportioning the relative lengths of the arms *f'*, *g*, and G', as to render necessary but a slight motion of said lever in order to move said teeth the required distance, and next, by causing the lower end of the rod I to slide freely downward through said arm *g'*, and attaching to the former a spiral spring, *i*, which, at its lower end, bears upon the latter. When, now, the teeth *f* and *f* have turned upward to the desired position they are arrested by suitable stops, after which the operating-rod I will pass downward through the arm *g'*, and merely compress the spring *i*. The grain, when compressed, is bound by means of a cord, K, which passes from a spool or reel, L, beneath the table A'', rearward through a stud, M, that extends upward from said table, through a slot, *a'*, in the front wall of the cavity A', beneath and around the grain, through a slot, *d*, in the front wall of the spring-plate D, and thence to a pair of nippers, N, which are pivoted to the lower side of lever B, and are held together by means of a spring, *n*, as seen in Fig. 7. It is intended that the pinchers N shall grasp the cord L just in rear of the stud M, and that they shall be opened at the instant they reach the upper end of the latter, which result is accomplished by forming upon the rear side of said stud a Λ -shaped lug, *m*, that passes between and separates said pinchers as they

move downward. When the pinchers pass below the lug *m* they automatically close together and grasp the cord L, which is just beneath. To remove the lug *m* from between the pinchers the stud M is secured to or upon one end of a bar, *m'*, which extends forward within a corresponding groove, *a''*, and is capable of sliding longitudinally therein. A spiral spring, *m''*, coiled around said bar, and arranged to bear against the front side of the stud M, causes said parts to maintain position at the rear limit of their motion (as seen in Fig. 8) until the instant when the pinchers N pass below the lug *m*, when the outer hooked end of said bar *m'* is engaged by a wedge-shaped incline, O, that is formed upon the side of a bar, O', secured to and extending downward from the outer end of the lever B, and is by said incline moved outward to the position shown in Fig. 9.

After the grain has passed into the holder, the end of the cord L, which is held within the pinchers N, is carried downward until it bears upon the upper side of the table A'', beside the cord which has just been drawn through the stud M, at which instant both portions of the said cord are severed, by means of a cutter, P, that is attached to the lever B, just in rear of said pinchers. The severed ends of the cord L are fastened together by means of a sheet-metal clasp, Q, which is formed upon and cut from the end of a strip of metal, Q', in the following described manner: The strip Q' passes from a reel, R, placed beneath the table A'', between two geared feed-rollers, S and S', that are suitably journaled at the edge of said table in such position as to bring the periphery of said lower roller S' just above the upper surface of the latter. From the feed-rollers S and S' the metal strip passes beneath the cord L, across the rear side of the table A'', to a point just beyond the transverse center of the same, where a curved lug, T, (seen in Fig. 1,) turns its end upward and backward over the ends of said cord, when a die, U, attached to and moving with the lever B, impinges upon said metal, presses its backward-turned end upon said cord, and, at the same instant, a cutter, V, placed at the side of said die, severs the clasp Q from the strip Q'. In order that the clasp Q may be more firmly fastened together, the die U is provided with two projections, *u u*, &c., which pass into corresponding cavities *u' u'*, &c., in the table A'', and, cutting through the clasp Q, press downward upon one side of the cord ends two lips *q* and *q*, as seen in Fig. 10. The metal strip Q' is fed forward, just before the lever B reaches the limit of its downward stroke, by means of a series of ratchet-teeth, *o', o'*, &c., which are formed upon the side of the bar O, opposite to the incline *o*, and engage with a toothed wheel, S'', that is secured to or upon the end of the shaft *s* of the lower feed-roller S'. In order that said bar O may be relieved from engagement with said wheel S'' upon its upward movement it is pivoted

at its upper end and is held in position by means of a spring, o'' , which yields readily when the inclination of said teeth o' and o' tend to press said bar away from said wheel. As soon as the bound sheaf is released from pressure by the upward motion of the lever B, it is thrown endwise from the holder A' by means of a barbed stud, W, that projects from and works within a slot formed within the rear lower side of said holder. The stud W is attached to one end of a bar, W', the opposite end of which projects beyond the side of the base A, and is hooked, as seen in Fig. 1. A bar, X, having a wedge-shaped lower end, x , is pivoted to the rear portion of the lever B, in such position as to cause said lower end to engage with the hook w of the bar W', as said lever moves downward, and, by means of its inclined outer edge, move said hooks, said bar W', and the barbed stud outward. After passing nearly to the downward limit of its stroke, the bar X is released from engagement with the bar W' by cutting away enough of its face to enable the hook w to slip off from the same, after which said bar W' is returned to position (as soon as the bundle of grain is loose) by means of a suitable spring. The upward movement of the lever B is limited and regulated by means of a screw, Y, which passes downward through its end in rear of its pivotal bearings, and bears upon the base A. By turning said screw downward its end will come into contact with said base and arrest the upward motion of said lever sooner than when withdrawn by being turned in an opposite direction, by which means the vertical dimensions of the opening through which grain passes to the binder are varied at will.

Having thus fully set forth the nature and merits of our invention, what we claim as new is—

1. The journaled shaft F provided with the fingers f and f and spring-arm f' , the rod g , the spring-arms G and g' , the pivoted block H, the rod I, and the spring i , all constructed

and combined to operate in the manner and for the purpose substantially as shown.

2. The pivoted lever B, provided near its outer end with the pick-up jaws N, in combination with the perforated stud M m working within the table A'', substantially as and for the purpose set forth.

3. In combination with the table A'' the cutter P attached to the lever B in rear of the pick-up jaws N, and arranged to sever the binding-cord L just before the same is grasped by said jaws, substantially as is shown and described.

4. In combination with the die U, provided with the projections u and u , and secured to and moving with the lever B, the table A'' having the curved lug T and the recesses u' and u' for the reception of said projections, substantially as and for the purpose specified.

5. The geared feed-rollers S and S' and toothed wheel S'', in combination with the ratchet-bar $o o$, attached to and moving vertically with the end of the pivoted arm B, substantially as and for the purpose shown.

6. The toothed stud W, attached to and moving horizontally with the bar W', in combination with the bar X, provided with the wedge-shaped lower end x , pivoted to the lever B and arranged to engage with the hooked end x of said bar X, substantially as and for the purpose shown and described.

7. In combination with the pivoted binding or compressing arm B the screw Y, passing downward upon its rear end and bearing at its lower end upon the base A, for regulating the opening through which grain flows to the binder, substantially as and for the purpose specified.

In testimony that we claim the foregoing we have hereunto set our hands this 19th day of January, 1875.

CHARLES F. CARR.
STEPHEN S. WILCOX.

Witnesses:

W. G. JAMES,
D. DIKE.