2 Sheets—Sheet 1.

J. H. GORDON.

GRAIN-BINDER.

No. 175,556. Patented April 4, 1876.

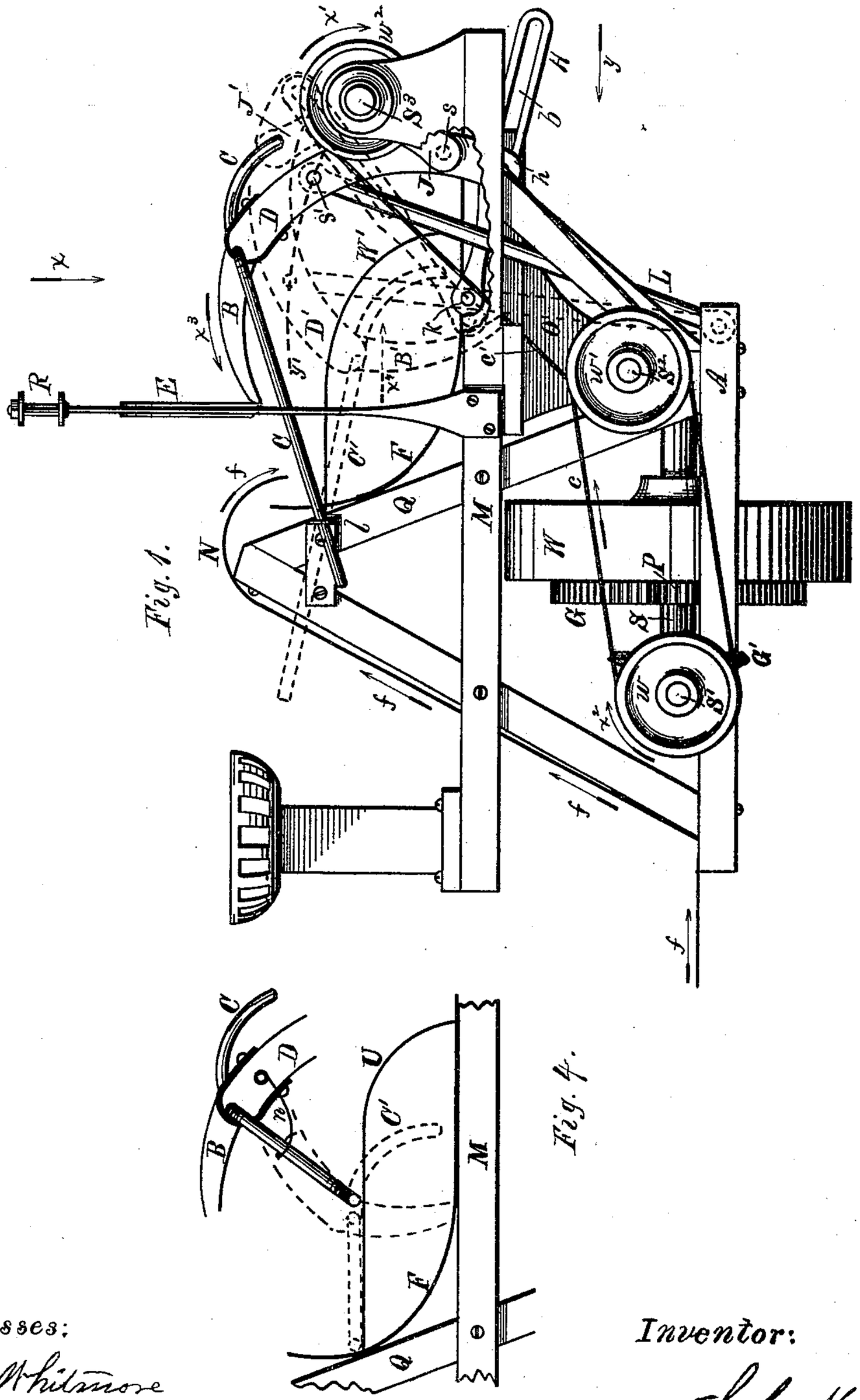

Fig. 1.

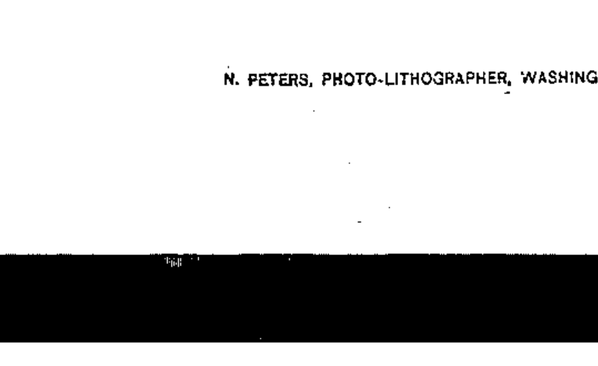

Fig. 4.

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Inventor:

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2 Sheets—Sheet 2.

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Fig. 2.

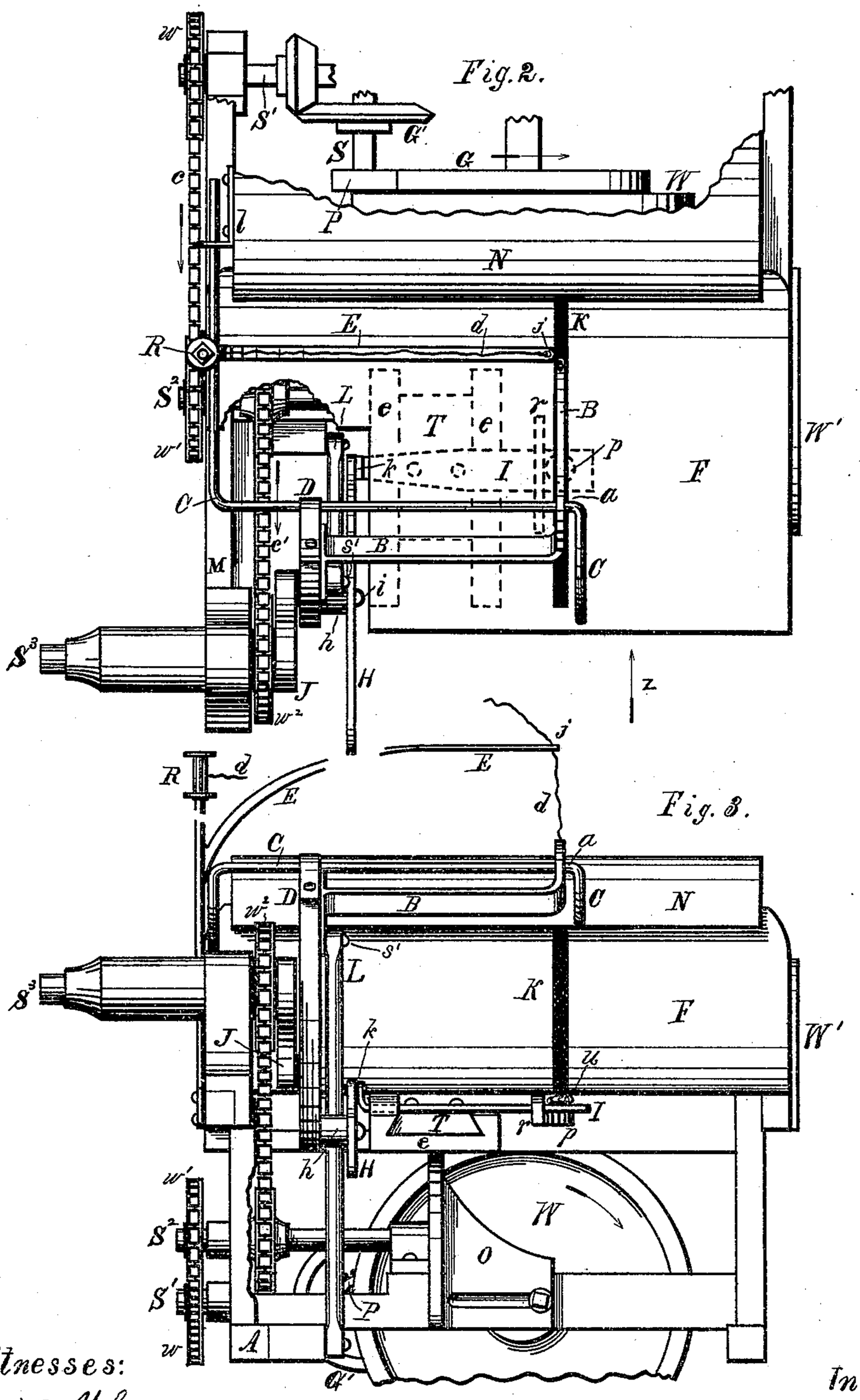

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN H. GORDON, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **175,556**, dated April 4, 1876; application filed December 9, 1875.

To all whom it may concern:

Be it known that I, JOHN H. GORDON, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Grain-Binders, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

Figure 1 is a rear elevation of my invention, showing the binding mechanism at two points in its movement. Fig. 2 is a plan view of the same, looking in the direction of the arrow *x* in Fig. 1. Fig. 3 is a side elevation of the same, looking in the direction of arrows *y* in Fig. 1, and *z* in Fig. 2. Fig. 4 shows a modification of the manner of operating the compressor C.

The object of my invention is to provide a new mechanical arrangement, by which the binder-arm of a grain-binder is given a steady and easy motion, and by which the twisting or tying apparatus is moved in a proper manner with reference to the motion of the said binder-arm; also to provide a new manner of operating the compressor.

The said invention is intended more particularly as an attachment to that class of reapers in which the cut grain is carried over the driving-wheel and delivered to the binding apparatus.

Referring to the drawings, Fig. 1 represents such a reaper moving away from the observer. The course of the cut grain moving toward the binder is indicated by the arrows *f*. G, Figs. 1 and 2, is a gear attached to the driving-wheel W, turning the shaft S, and, secondarily, the shaft S^1, with its wheel *w*, in the direction indicated by the arrow x^2. The shafts S^2 and S^3 are driven by the chains or belts *c* or *c'* running upon the wheels w^1 and w^2, respectively. D, Figs. 1, 2, and 3, is a binder-arm carrier, driven by the crank J, which is keyed to the forward end of the shaft S^3. B, Figs. 2 and 3, is a binder-arm bar rigidly fastened near the upper end of the binder-arm carrier D. Said bar B extends some distance horizontally away from the said carrier D, and perpendicularly thereto, then turns at a right angle toward the accumulating cut grain, and in a vertical plane parallel to that of the binder-arm carrier D. The extremity of the bar B, Fig. 1, is tapered toward a point, and suitably curved to form the binder-arm proper. The crank J, Fig. 1, is pivoted to the binder-arm carrier D at the point *s*, and at *s'* the sway-bar L is pivoted, which extends downward, having its lower end hinged at or near the sill A. As the crank J, Fig. 1, is revolved, the upper end of the sway-bar L is caused to vibrate through the dotted arc *y'*. At the same time the point *s* is carried around in a circle upon the pin of the crank J, tilting the binder-arm carrier upon the sway-bar at or near the point *s'*, which motion, combined with that of the said sway-bar, causes the binder-arm to move successively forward, downward, backward, and upward at each revolution of the said crank J. For instance, when the crank is at the position shown in full lines at J, Fig. 1, the binder-arm occupies the position shown in full lines at B. When the said crank occupies the position indicated by dotted lines at J', the binder-arm will be in the position shown in dotted lines at B'. The arrows x^3 and x^4 indicate the direction of motion of the binder-arm when in the respective positions shown. R is a reel, placed upon a standard conveniently located, and E is some suitable guide, extending over and at some distance above the binder-arm B. Through the end *j*, Figs. 2 and 3 of said guide, the wire or twine *d*, used for binding the grain, passes on its way from the reel to the point of the binder-arm. C, Figs. 1, 2, and 3, is a compressing-rod, designed to compress the grain while the same is being encircled by the wire. The said compressing-rod or compressor is journaled at the upper end of the binder-arm carrier D, and in the binder-arm B at *a*. Near the point where it rests in the binder-arm carrier D the said compressor is bent at a right angle, and extends nearly horizontally away from the said carrier D, and passes freely through the loop *l*, Figs. 1 and 2, rigidly fastened to or near the frame. Near the point at which the compressor rests in the binding-arm B it is bent at a right angle in an opposite direction from that of the above-described bend in the same, then curves downward toward the receptacle F. The loop *l* being fixed, it will be understood from Fig. 1 that when the binder-arm B plunges into the grain and moves down-

ward, the curved end of the compressor C will also move downward, the two compressing the grain as between concave jaws, (see dotted position,) while it is being encircled by the wire and bound. I, Figs. 2 and 3, is a twister-carrier bar, lying horizontally near to and beneath the receptacle F, and fastened rigidly to the sliding block T. *p* is a pinion, and *u* some suitable form of twister, which together are held by the carrier-bar I immediately under the slot K cut through the receptacle F. The block T being made to slide within the ways *e*, the bar I, pinion *p*, and twister *u* are together capable of being moved laterally underneath the receptacle F, and in a line parallel to the slot K. The ways *e* are supported from below by the standard-brace O. H, Figs. 1, 2, and 3, is a slotted connecting-bar, pivoted at *k* to the upturned end of the carrier-bar I. *h*, Figs. 2 and 3, is a hub extending out from the lower end of the binder-arm carrier D, reaching to meet the said connecting-bar H. *i*, Figs. 2 and 3, is a headed stud or pin, which passes through the slot *b*, Fig. 1, of the connecting-bar H, along which it may freely slide, and enters the end of the hub *h*, wherein it is rigidly fixed. As the binder-arm carrier D is moved by revolving the crank J, the stud *i* will traverse the slot *b*, alternately coming in contact with one and the other end of the same. As it presses at either end of the said slot a horizontal motion, corresponding in direction, will be given to the twister-carrier bar I, which motion is so timed that the twister *u* moves in harmony with the point of the binder-arm, while the latter passes beneath the receptacle F, and the ends of the wire are being twisted. From observing the movement of the stud *i* within the slot *b*, it will be understood that the motion of the twister-carrier bar I is intermittent and reciprocal—that is, it rests during each period that the said stud moves along the slot *b*, and moves as the same presses at either end. The twister *u* is revolved alternately in opposite direction by the pinion *p* rolling along the fixed rack *r*, Figs. 1 and 2, as the carrier-bar I moves backward and forward.

It may be desirable in the working-machines to form the binder-arm carrier D and binder-arm B both of one continuous piece, in shape substantially as shown in the drawings.

It is designed to so attach the whole binding mechanism to the reaper that it may be shifted in a body, forward or backward, with reference to the line of draft. This is for the purpose of permitting it to bind the gavels at the middle when cutting tall or short grain.

Fig. 4 shows a modification of the manner of operating the compressor C. U is a bar or rod, (in practice it may be a board,) forming a track fastened to the frame or receptacle F, extending up some distance therefrom, situated parallel with and conveniently near the vertical plane in which the binder-arm carrier D moves. Upon said track U the end of the compressor C, nearest the carrier D, rests, held thereon by the action of the spring *n*. As the binder-arm carrier D moves downward, encircling the gavel with the wire, the compressor assumes the position shown in dotted lines at C′.

It may be desirable to give the loop *l*, Figs. 1 and 2, a vertical movement, and rest it upon a spring, so that when an unusually large gavel is being compressed the said loop will yield downward, and thus partially relieve the pressure of grain upon the compressor C.

I claim as my invention—

1. In a grain-binding machine, a binder-arm carrier, D, swinging and tilting upon a sway-bar, L, in combination with a suitable actuating mechanism, for the purpose set forth.

2. The overhanging binder-arm B, rigidly fastened to and moving with the binder-arm carrier D, in combination with a sway-bar, L, and crank J, substantially as and for the purpose described.

3. The crank J, in combination with the binder-arm carrier D, binder-arm B, and sway-bar L, substantially as and for the purposes described.

4. A connecting-bar H, pivoted to the movable twister-carrier bar I, and operated by the binder-arm carrier D, or its equivalent, substantially as shown and described.

5. A sliding block, T, in combination with an over-hanging twister-carrier bar, I, and offset or overhanging binder-arm B, substantially as described, and for the purpose set forth.

6. The compressor C, journaled on the binder-arm B, and carrier D, or its equivalent, in combination with lever C′ and fixed guide *l*, whereby it is actuated in connection with the binding-arm, substantially as and for the purpose set forth.

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Witnesses:

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