2 Sheets—Sheet 1.

R. EMERSON & G. CASE.

Grain-Binder.

No. 217,596. Patented July 15, 1879.

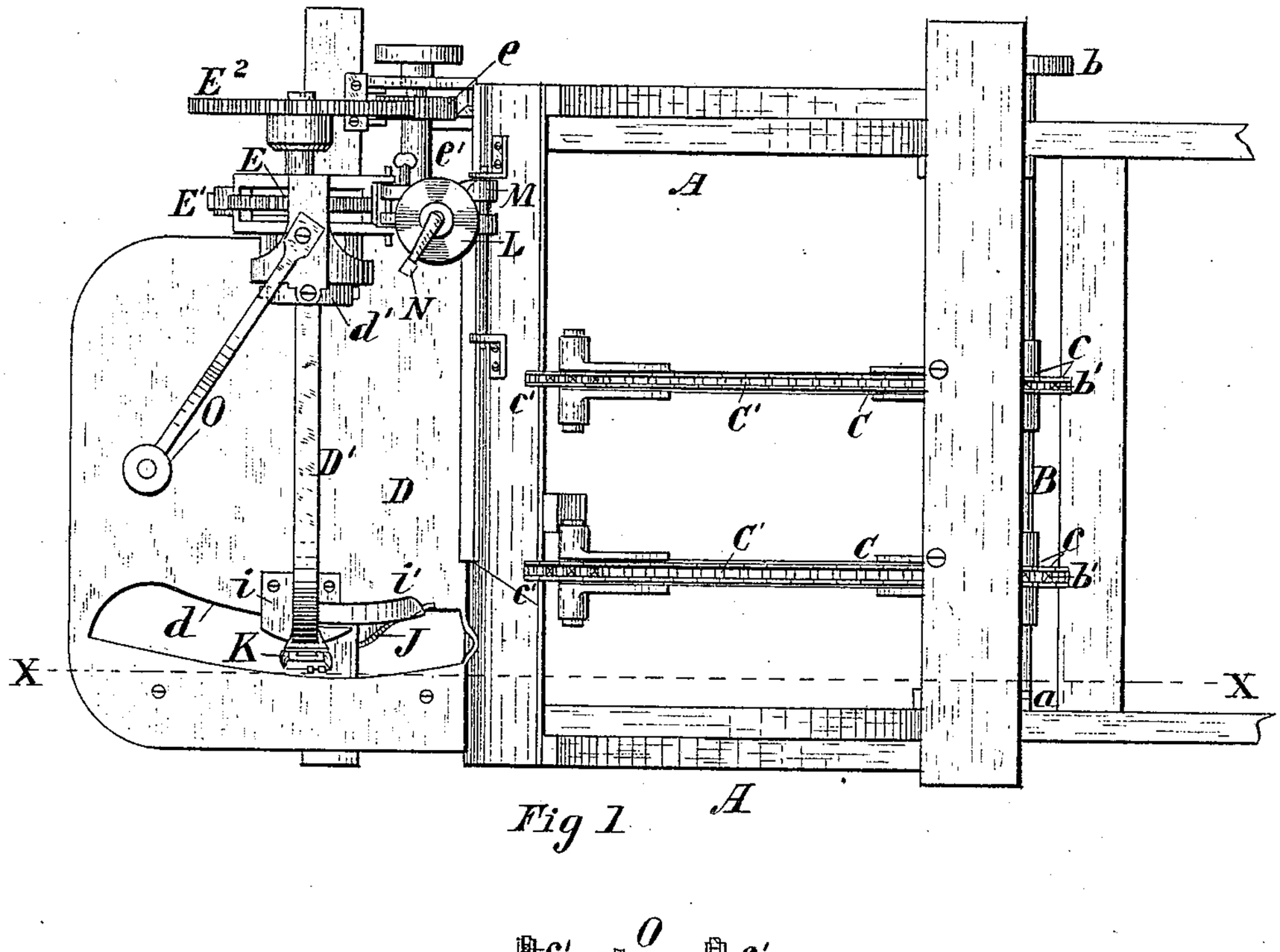

Fig 1

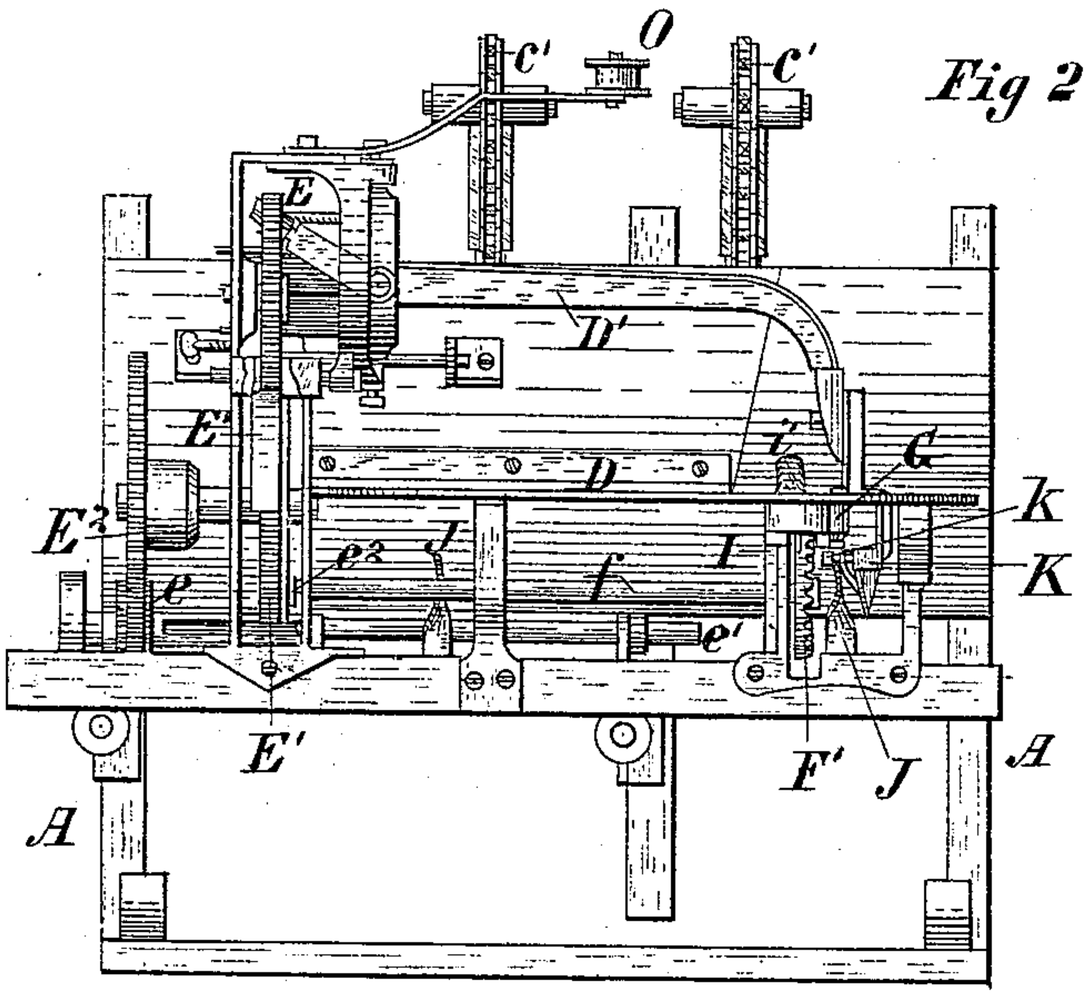

Fig 2

Witnesses
W. C. Curtis
Jno. C. MacGregor,

INVENTORS
Richard Emerson & George Case
By Osburn & Thacher
Attorneys

2 Sheets—Sheet 2.

R. EMERSON & G. CASE.

Grain-Binder.

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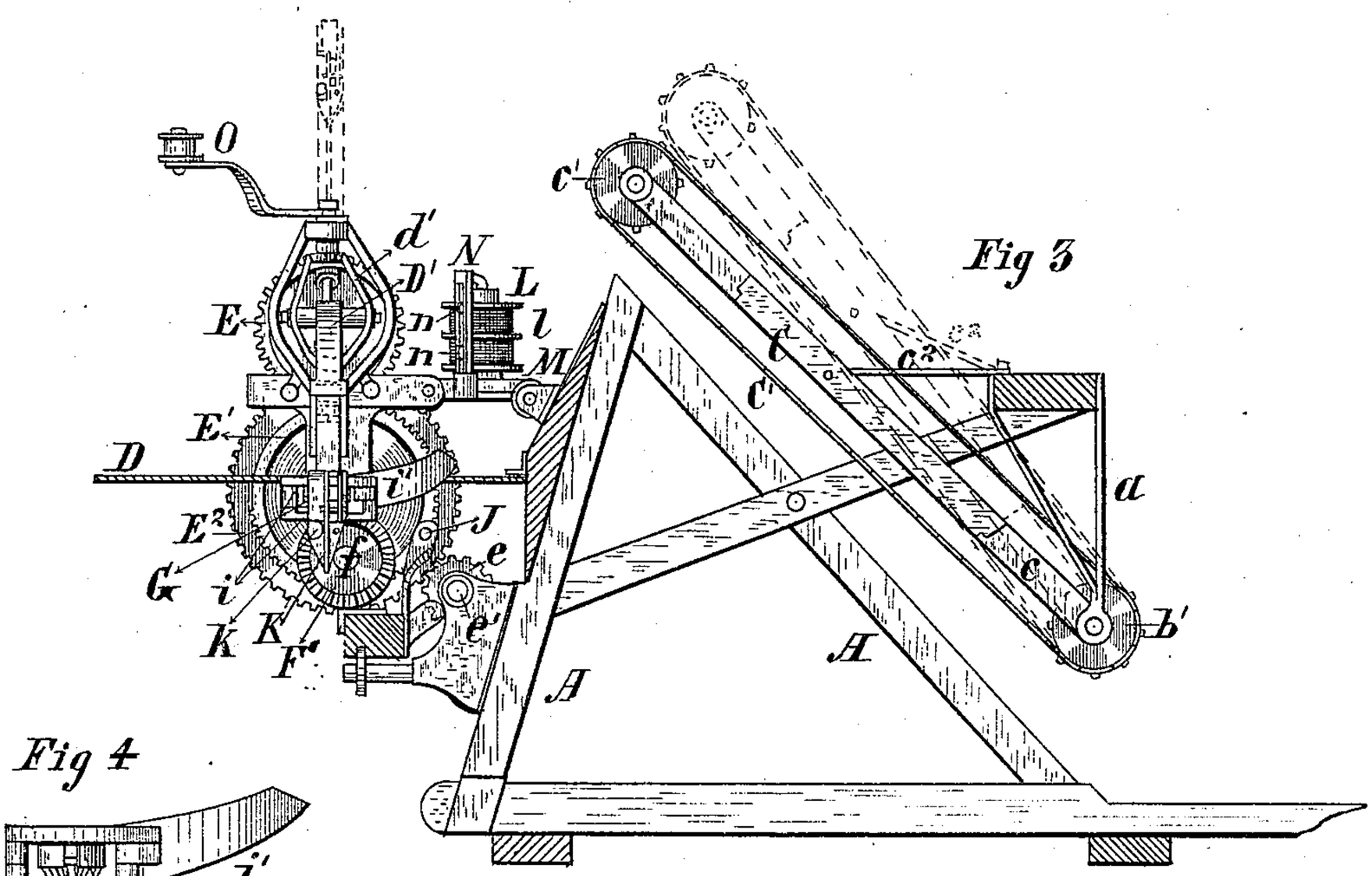

Fig 3

Fig 4

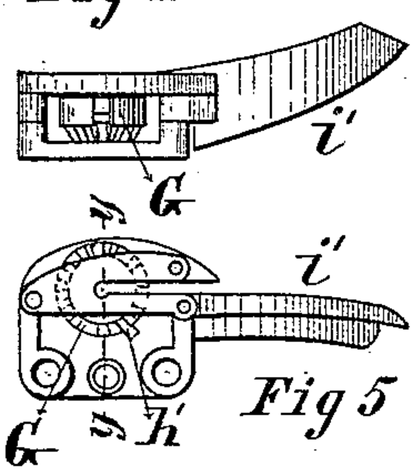

Fig 5

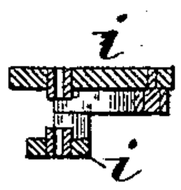

Fig 6

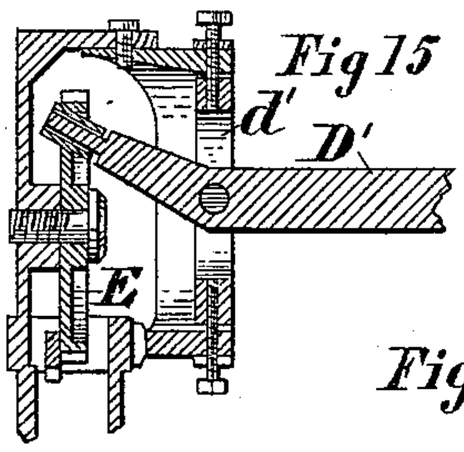

Fig 15

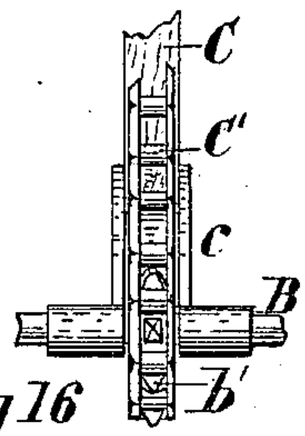

Fig 16

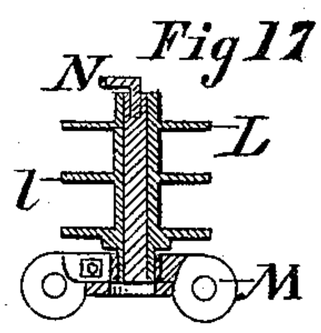

Fig 17

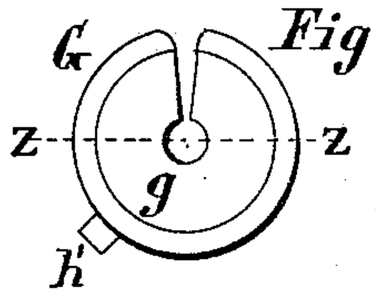

Fig 7

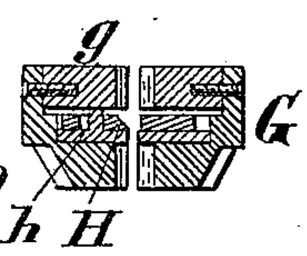

Fig 9

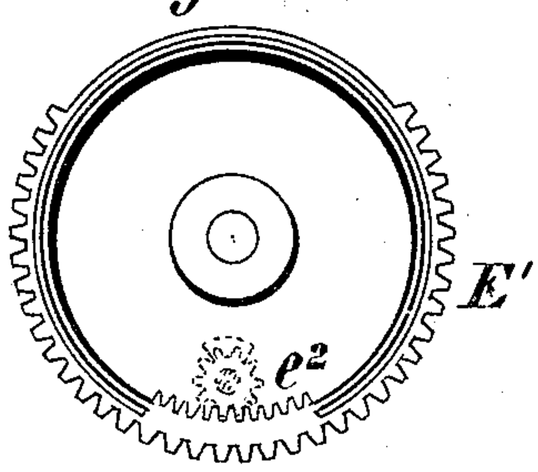

Fig 13

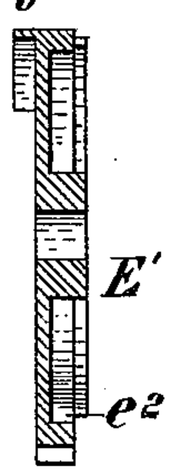

Fig 14

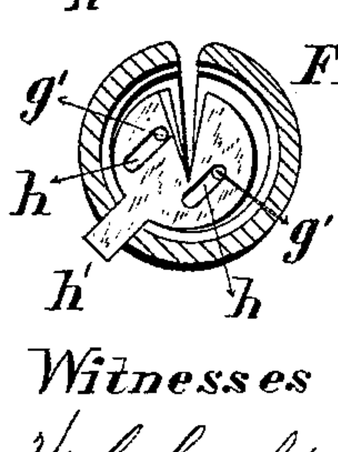

Fig 8

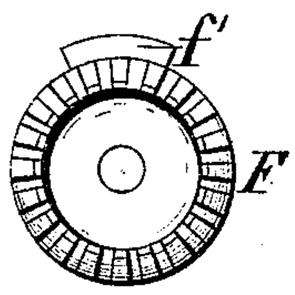

Fig 10

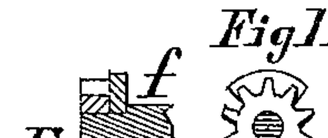

Fig 12

Fig 11

Witnesses

W. C. Curtis

Jno. C. MacGregor

INVENTORS

Richard Emerson & George Case

By Coburn & Thacher

Attorneys

UNITED STATES PATENT OFFICE.

RICHARD EMERSON AND GEORGE CASE, OF SYCAMORE, ILLINOIS; SAID CASE ASSIGNOR TO SAID EMERSON; SAID EMERSON ASSIGNOR OF ONE-HALF HIS RIGHT TO HORATIO H. MASON, OF SAME PLACE.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **217,596**, dated July 15, 1879; application filed October 5, 1878.

To all whom it may concern:

Be it known that we, RICHARD EMERSON and GEORGE CASE, of Sycamore, in the county of De Kalb and State of Illinois, have invented a new and useful Improvement in Grain-Binders, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of a harvester embodying our improvements; Fig. 2, an end elevation of the same on the stubble side of the machine; Fig. 3, a vertical section taken on the line *x x*, Fig. 1. Fig. 4 is a side elevation of the bracket and twister; Fig. 5, a bottom plan of the same; Fig. 6, a cross-section taken on the line *y y*, Fig. 5. Fig. 7 is a plan view of a twister on an enlarged scale; Fig. 8, a longitudinal section of the same; Fig. 9, a transverse section of the same, taken on the line *z z*, Fig. 7; Fig. 10, an elevation of the gear-wheel which drives the twister; Figs. 11 and 12, elevation and sectional view of the pinion which drives the gear-wheel; Figs. 13 and 14, elevation and sectional views of the main driving-gear of the binder; Fig. 15, a detail section, showing the mechanism for vibrating the binding-arm; Fig. 16, a detail elevation, showing the attachment of the grain-guards; and Fig. 17, a sectional view of the two-wire-band spool.

Our invention relates to harvesters in which automatic binding apparatus is used, and to that particular class of binders in which a swinging vibrating arm is employed.

The invention consists in a grain-guard composed of independently-vibrating arms having sprocket-wheels and chains, hinged to a shaft also provided with sprocket-wheels.

It also consists in various improvements in the construction of the twister and other devices peculiar to a grain-binder, all of which will be hereinafter more fully set forth, and specifically pointed out in the claims.

In the drawings, A represents the supporting-frame of a harvester, which may be of any ordinary construction. At the inner portion of this frame are pendent brackets *a*, attached to some suitable support and extending down over the inner end of the grain-platform. In these brackets a shaft, B, is mounted, provided at one end with a driving-pulley, *b*, and carrying a series of sprocket-wheels, *b'*, which are rigidly secured to the shaft. Arms C are hinged at their lower ends to the shaft B by means of the pieces *c*, as shown in Fig. 16 of the drawings. Sprocket-wheels c^1 are mounted in the upper ends of these arms, and sprocket-chains C' are run over the upper and lower sprocket-wheels. The upper ends of the arms are free, so that they readily rise and fall, turning on the shaft, which is driven, so as to make the course of the lower portion of the chain upward. These vibrating arms are arranged over and upon the grain as it is elevated from the platform, and act as a guard to the grain, the weight at the upper ends being sufficient to hold it down, while at the same time the arms vibrate to accommodate inequalities in the quantity of grain.

If desired, cords or chains c^2 may be attached to the vibrating arms and fastened to the frame-work of the machine, to prevent the arms from falling below a certain point, so as to interfere with the elevating devices.

It will be understood that any of the elevating devices common to this class of machines may be employed, the grain being carried up and discharged at the top of the elevator upon a receiving-table, D, which is provided with a slot, *d*, to accommodate the binding-arm D'. This binding-arm is pivoted horizontally to a yoke, *d'*, which, in turn, is pivoted vertically to a suitable support in rear of the grain-table—that is to say, the binding-arm is connected to its support by a kind of gimbal-joint. The rear end of the arm extends through and beyond the yoke, and is pivoted to a gear-wheel, E, which is driven by a gear-wheel, E^1, the toothed rim of which is broken so as to give the necessary rest to the binding-arm at the proper time.

It is evident that this mode of supporting the binding-arm, in connection with the attachment of the rear end thereof to the gear-wheel E, will produce a vibration of the arm both vertically and horizontally as the gear-wheel is rotated.

The gear-wheel E is upon the same shaft as

the main driving-gear E^2, which is driven by a pinion, *e*, on a shaft, e^1, on which it is permitted to slide back and forth.

The whole binding apparatus is mounted upon a frame adjustable back and forth to suit different lengths of grain, the pinion *e* being carried with it, so that the binding mechanism is not thrown out of gear by this movement.

The gear-wheel E^1 is also provided with a short section, e^2, of internal gearing, with which a pinion, F, engages, that is mounted on a shaft, *f*, carrying at its other end a bevel-gear, F′, which drives the twister-pinion G, and is provided at its outer edge with a short sectional cam-projection, *f′*.

The twister-pinion G is slotted in the usual way, but is in some respects of peculiar construction. Its upper face is recessed, and is fitted with a slotted cap or plug, *g*, fastened in place by screws or any other suitable device.

Within the recess and below the cap is arranged a cutter, H, in the shape of a disk, slotted as shown in Fig. 8 of the drawings. This cutter is held in place by pins *g′* projecting into slots *h* in the cutter, arranged to permit the cutting-edge at the slot of the disk to move across the slot in the twister with a shearing cut. The disk-cutter is made smaller than the recess to permit this movement, which is effected by a projection, *h′*, on the disk, which projects out through the twister, and is driven at the proper moment by the cam *f′* on the wheel F′. As the cutter is free to slide, and is released from the cam as soon as the band is cut, it is forced back when the wire for a new band is carried into the slot of the twister.

The twister is mounted in a bracket or support, I, arranged upon a standard over the bevel-wheel, F′, and is held in place by upper and lower studs, *i*, in the bracket, which enter corresponding holes in the upper and lower faces of the pinion, the lower stud being on a plate detachable from the main portion of the bracket.

A long projection or guiding-arm, *i′*, extends inward toward the elevator, and the bracket is slotted, as shown in Fig. 5 of the drawings, for the purpose of guiding the wire into the slotted twister. This twister is designed for two wires, one of which is carried by the binding-head in the usual way, and the other of which is conducted through guides J to a point just in front of and below the twister-pinion, the outer guide, J, being arranged to effect this result. The binding-arm is provided with a head, K, which is recessed or bent, as shown in Fig. 2 of the drawings, to pass around the bracket and twister as it comes into position for twisting the band. The head is also provided with a pin, *k*, which catches the under wire at the guide J and carries it through the slot in the bracket into the slotted twister, the upper wire threaded to the binding-head K being also carried in at the same time. The projecting guide *i′* serves to direct the band-wires into the slot, so as to insure their entrance to the twisting-pinion. Both wires being now in the slot of the twister, the latter is rotated, thereby forming a twist in the usual way, and at the proper moment the cutter H is forced outward and severs the twist about in the middle, so that one part will act as a fastener to the band around the bundle, while the other serves to join the two wires together, and is pulled from the twister as the binding-arm moves forward again.

The binding-head is detached from the arm, if desired, and is shown in the drawings fastened thereto by a screw. The forward movement of the binding arm will evidently place the wire around the new bundle, and as it descends on the inside of the latter the lower wire will again be caught, and the operation above described again repeated.

The two band-wires may be on different spools; but I prefer to have them on the same spool, and for this purpose have devised a spool, L, provided with a central dividing-disk, *l*, so that two independent wires may be wound upon the same spool. This spool I mount upon a support, M, which is pivoted to the supporting frame-work of the binding gearing, and also to the elevator-frame, the latter hinge being constructed to permit the support to slide back and forth with the binding-frame. Hence the spool moves with the binder, and any vibration of the parts is compensated by hinged joints.

A slotted guide-post, N, is arranged just on the inside of the spool, being provided with pulleys *n* in the slot, over which the two band-wires respectively run, the lower one being connected down to the guides J, and the upper one led up to a tension device, O, and thence to the binding-head.

It will be understood, of course, that the gearing is timed suitably to effect the movements above described, and is provided with stops, so that the parts are held securely when at rest. The means for accomplishing these results are, however, well known, and do not require special description at this time.

We are aware that a binder-arm having horizontal as well as vertical motion is not new; and we are also aware that a grain-guard consisting of an endless apron, carried upon a frame hinged at the lower end, with a free upper end, is not new, and we have limited our claims in view of the admitted state of the art.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The shaft B, provided with sprocket-wheels *b′*, in combination with the independently-vibrating arms C, hinged thereto, the sprocket-wheels c^1, and the chains C′, substantially as described.

2. The independently-vibrating arms C, carrying the sprocket-wheels and chains and op-

erating as a grain-guard, as set forth, in combination with stop cords or chains c^2, substantially as described.

3. The recessed twister-pinion G, in combination with the sliding notched cutter H, mounted loosely within the recess and fastened by pins and slots, substantially as described.

4. The recessed twister-pinion G, in combination with the sliding cutter H, arranged within the recess, provided with a projection, h', and the gear-wheel F, provided with a cam, f', substantially as described.

5. The binding-head K, bent as set forth, in combination with the bracket I, pinion G, cutter H, within the pinion, and upper and lower band-wires, substantially as described.

RICHARD EMERSON.
GEORGE CASE.

Witnesses:
D. D. BROWN,
C. CARTER.