4 Sheets—Sheet 1

L. O. BREKKE.

Grain-Binder.

No. 218,225. Patented Aug. 5, 1879.

Fig. 1.

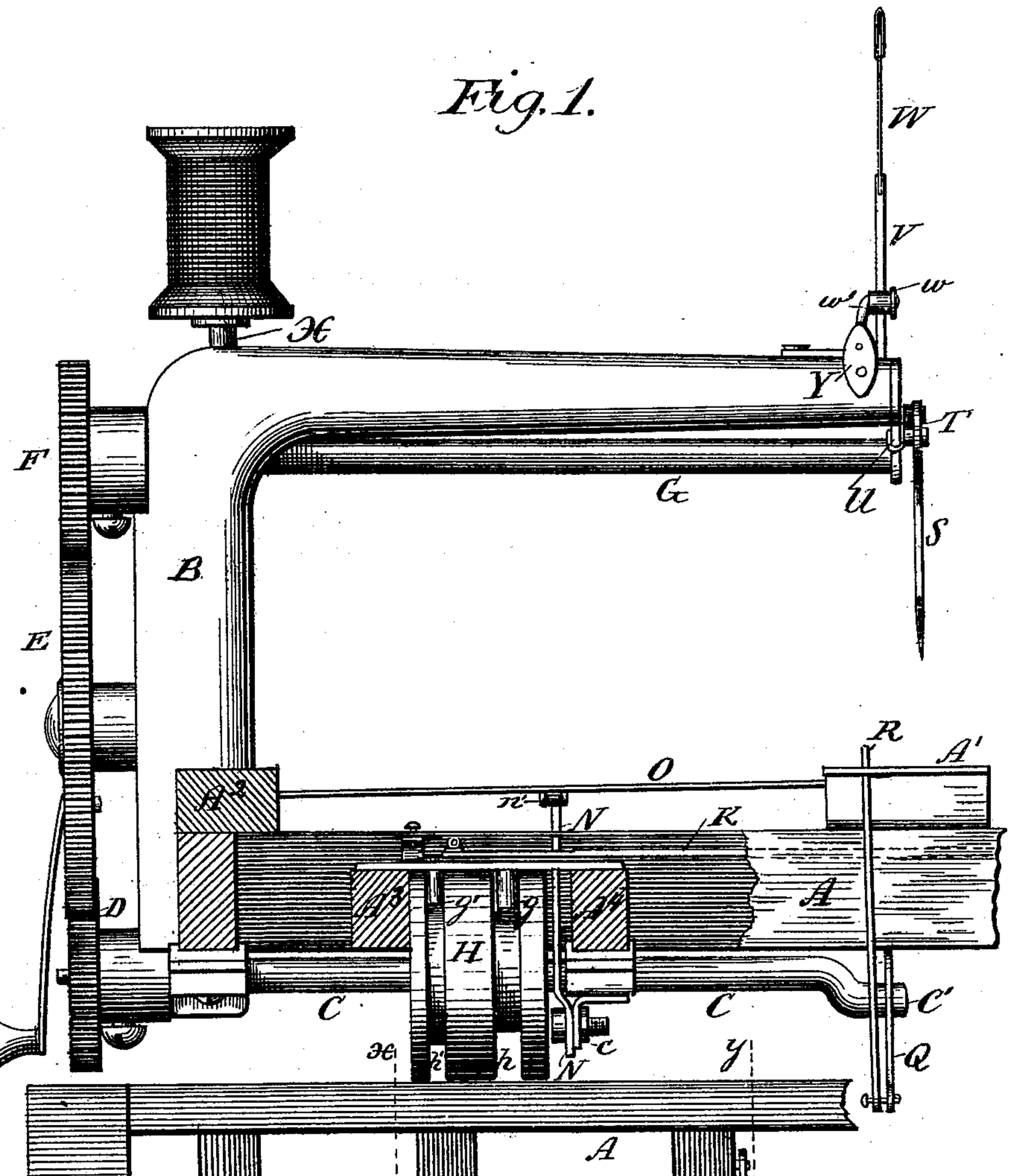

Fig. 4.

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Attorneys

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Fig. 2.

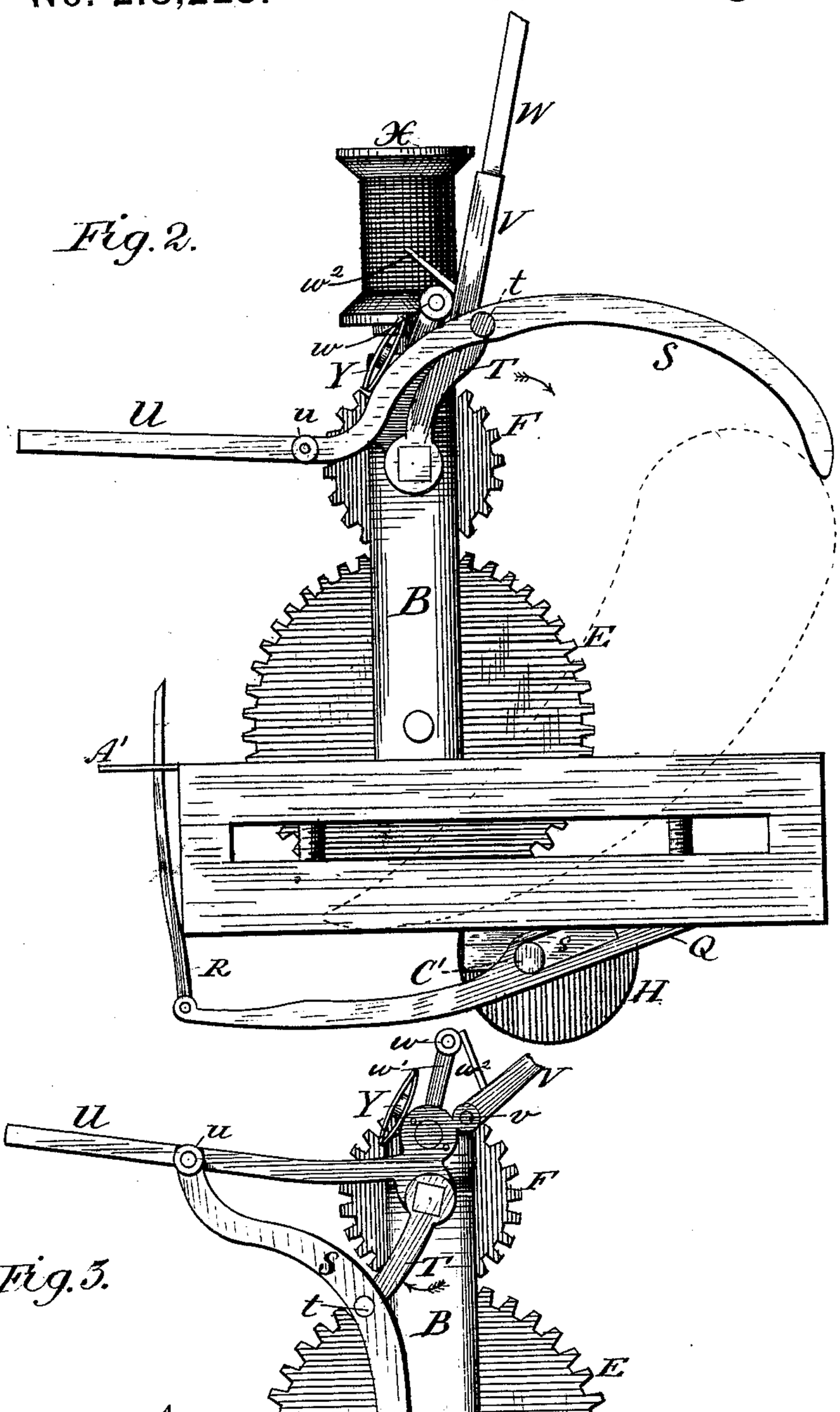
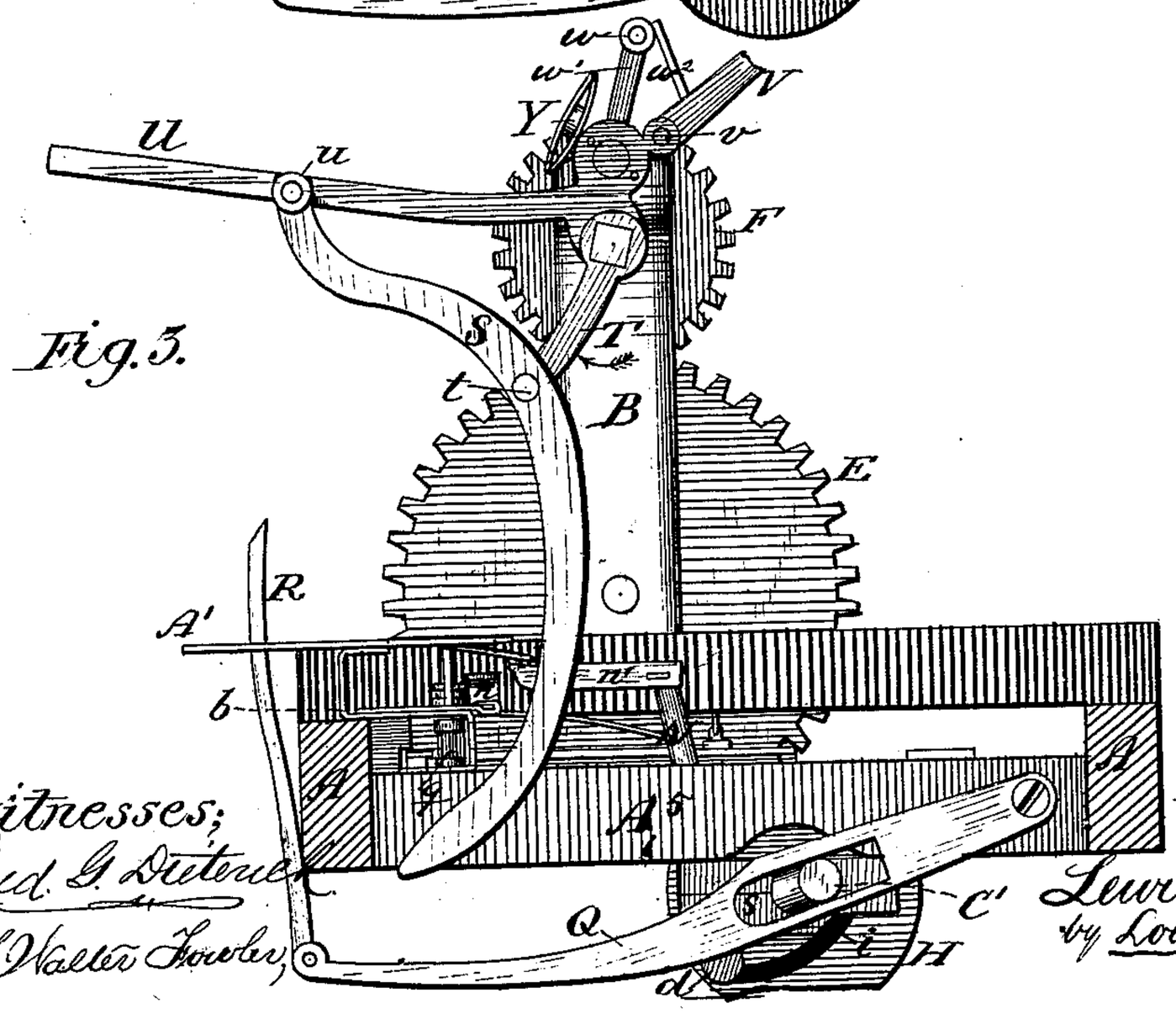


Fig. 3.



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Grain-Binder.

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Fig. 5.

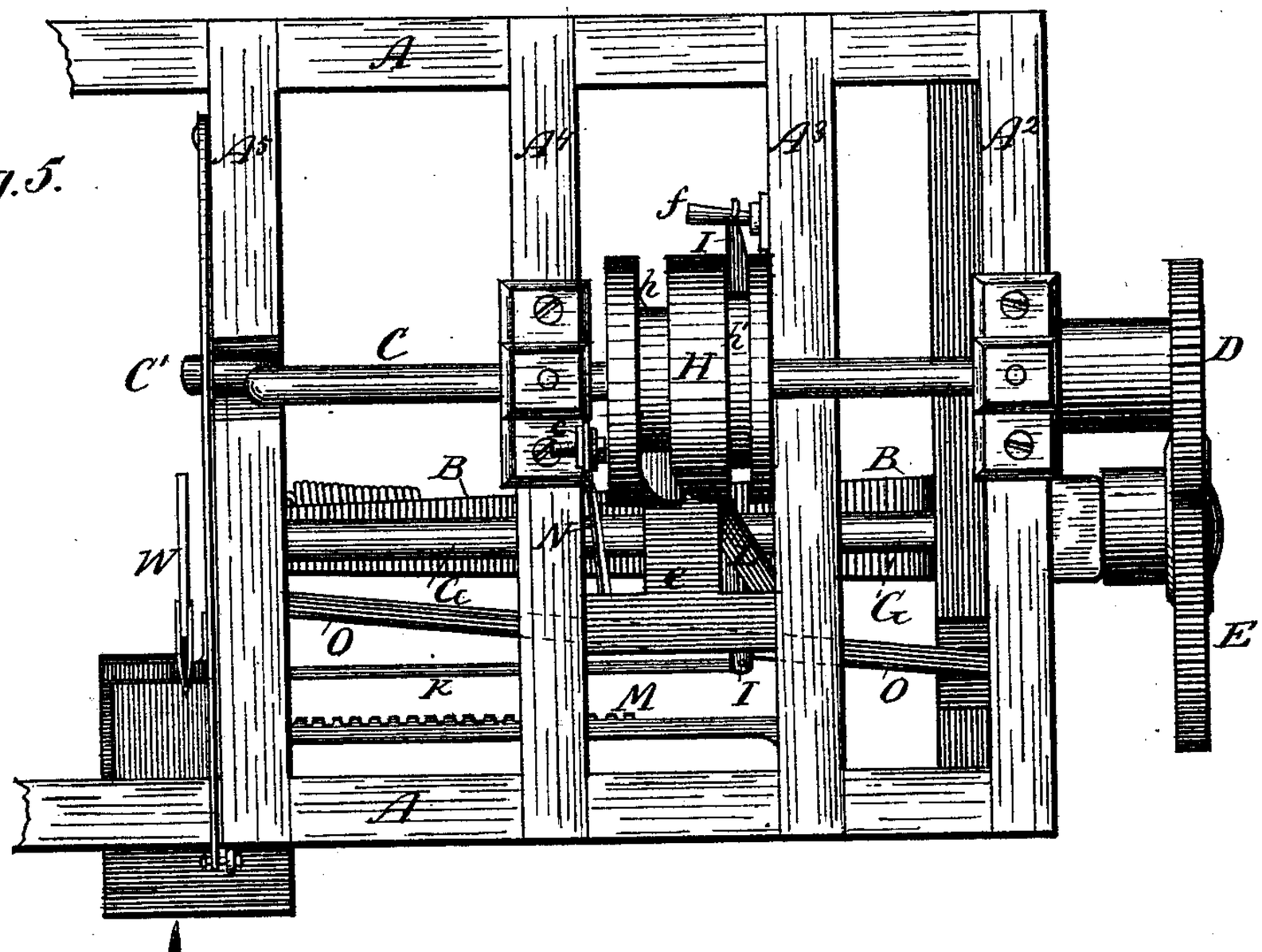

Fig. 8.

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Fig. 6.

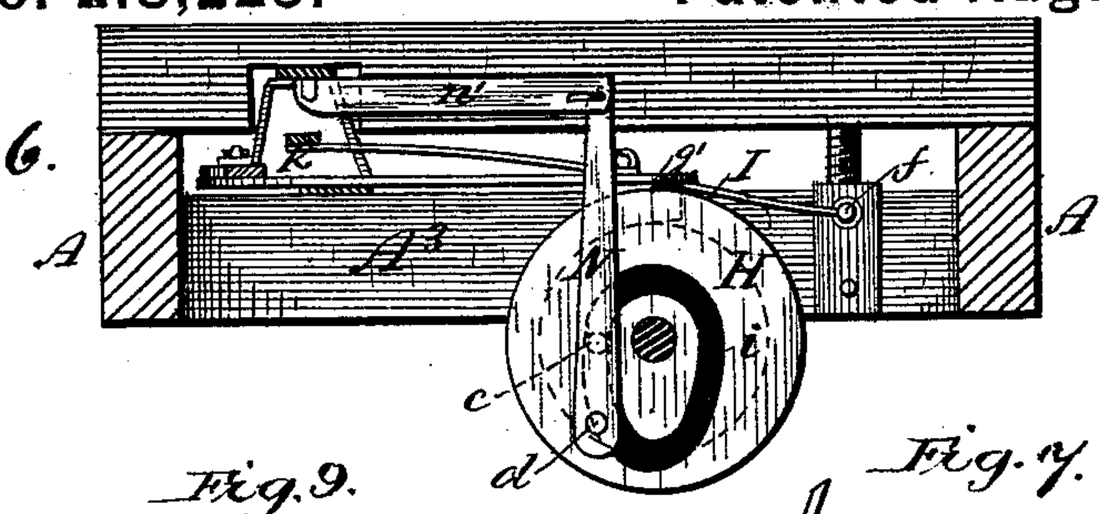


Fig. 9.

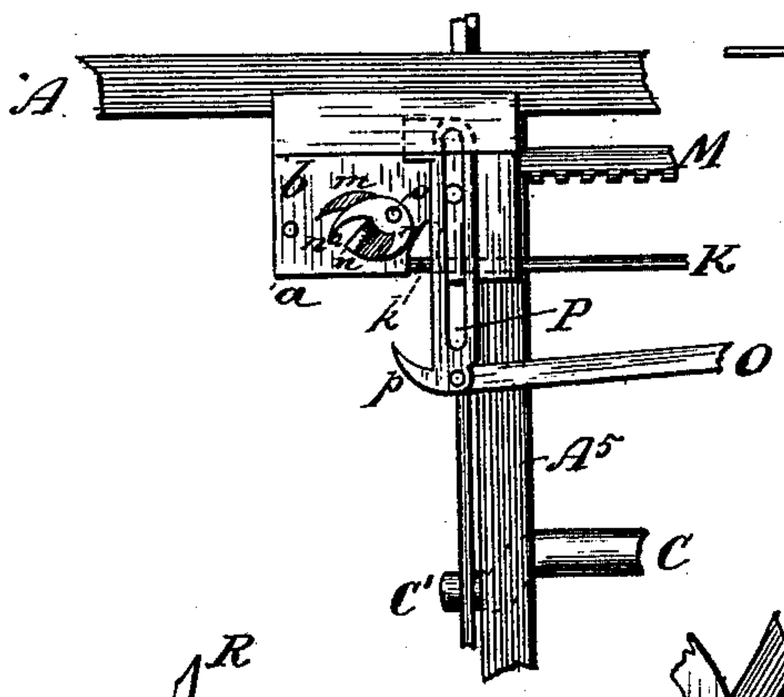


Fig. 7.

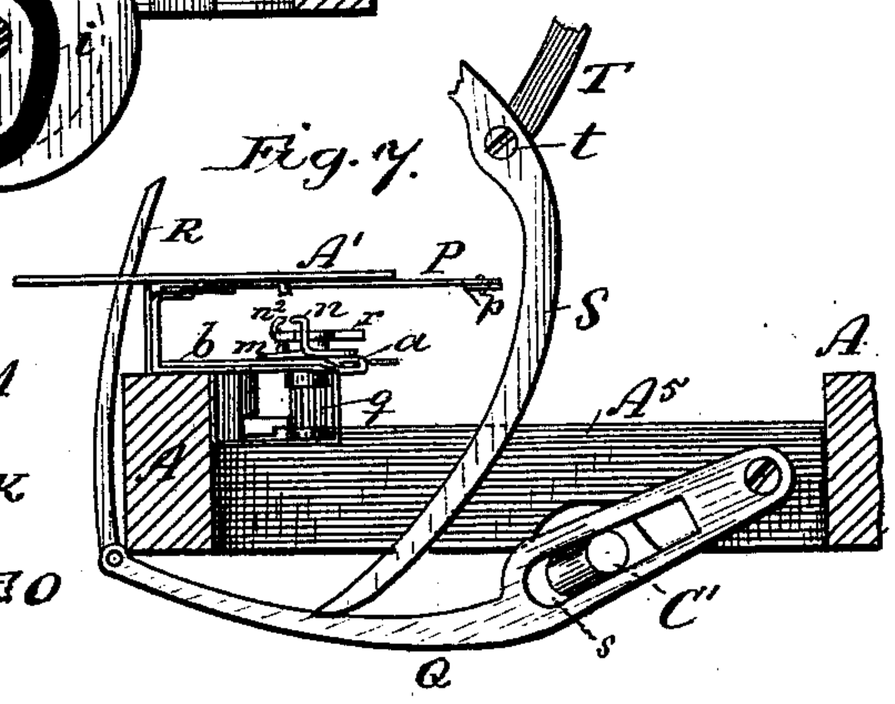


Fig. 10.

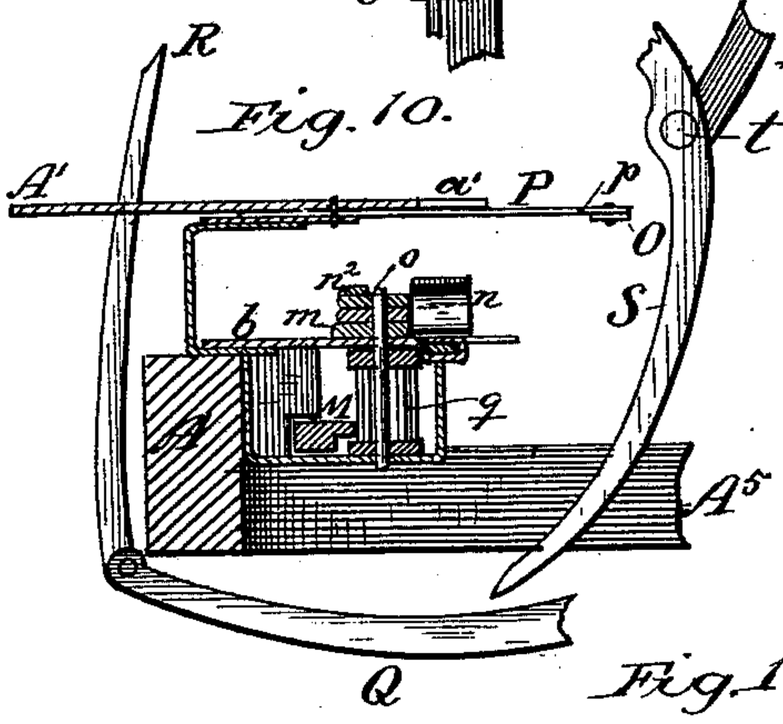


Fig. 11.

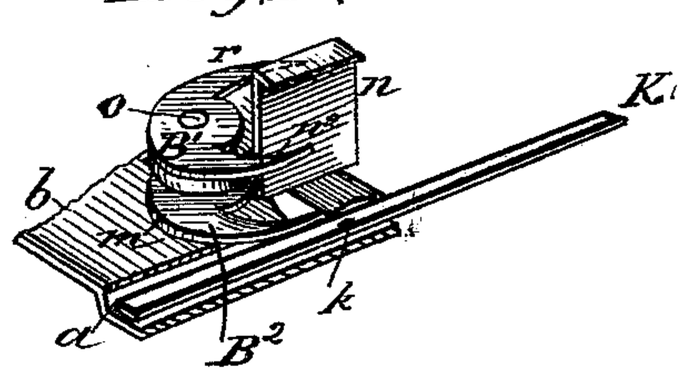
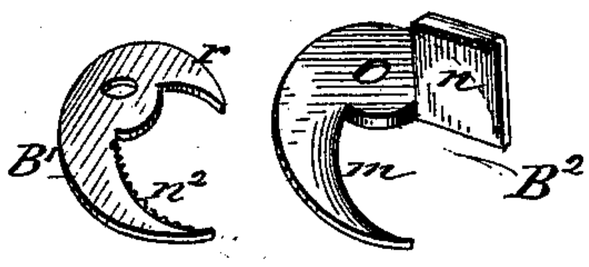


Fig. 12.



Witnesses;
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T. Walter Fowler,

Inventor;
Lewis O. Brekke.
by Louis Bagger & Co.
Attorneys

UNITED STATES PATENT OFFICE.

LEWIS O. BREKKE, OF DECORAH, IOWA, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM H. MANNING, OF SAME PLACE.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **218,225**, dated August 5, 1879; application filed February 1, 1879.

To all whom it may concern:

Be it known that I, LEWIS O. BREKKE, of Decorah, in the county of Winneshiek and State of Iowa, have invented certain new and useful Improvements in Grain-Binders; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation, a portion of the frame being broken away to better show some of the operating parts. Figs. 2 and 3 are front elevations, representing the wire-carrier or needle at its farthest backward and forward throw, respectively. Fig. 4 is a plan or top view. Fig. 5 is a bottom plan. Figs. 6 and 7 are cross-sections taken on the lines *x x* and *y y* in Fig. 4, respectively. Fig. 8 is a section on line *z z*, Fig. 4; and Figs. 9, 10, 11, and 12 are detail views, to which reference will be made hereinafter.

Corresponding parts are designated by like letters of reference in the several figures.

This invention relates to that class of grain-binders which use a single wire; and it consists in an improved construction, combination, and arrangement of the operating parts, as hereinafter more fully described, and pointed out in the claims.

The object of my invention is to produce a binder which shall be simple in its construction, and, therefore, not liable to get out of order, and which shall operate satisfactorily and successfully under all conditions and circumstances, without any tendency to slip or break the wire, and without wasting any wire in the process of twisting and cutting.

In the drawings, A is a part of the harvester or reaper frame, which forms a cradle or receptacle for the gavel, delivered into it by a suitably-constructed elevating-carrier. Only a portion of the cradle-plate A^1 is shown in the drawings; but this plate is extended laterally, or in the direction of the length of the frame, a sufficient length to form a firm support for the gavel.

B is a crane-post secured vertically in the end piece, A^2, of the frame; and A^3 A^4 A^5 are cross-bars, which connect the two side pieces of the frame and form bearings or supports for that part of the operating mechanism which is located below the frame and cradle.

Journaled in boxes or hangers on the under side of the end piece, A^2, and cross-piece A^4 is a shaft, C, forming a crank, C′, at one end, and having a gear-wheel, D, keyed upon its opposite end, back of the end piece, A^2. Gear-wheel D meshes with a larger gear-wheel, E, journaled upon a short axle projecting from the crane-post B, and which again meshes with the upper gear-wheel, F, keyed upon the projecting end of shaft G.

E is the drive-wheel of the binder, and receives its motion from the drive-wheel of the harvester or reaper by any suitable gearing or intermediate mechanism, which should be provided with a suitably-arranged treadle-clutch to gear or ungear the binding mechanism at will.

Keyed or otherwise secured upon the lower shaft, C, between the bars or cross-pieces A^3 A^4, is a cam, H, provided with two circumferential grooves, *h h′*, and a third groove, *i*, made in its front face or side. Into the rear-most groove, *h′*, works a pin, *g′*, which may be provided with a friction-roller, projecting downward from a horizontal vibrating lever, I, which has an adjustable fulcrum, to regulate its throw, in a projection, *f*, bracketed upon the cross-piece A^3. Articulated upon the other end of the vibrating lever I is a steel rod, K, the forward end of which slides in a guide-sleeve in the middle plate of the box or casting which contains the twisting and cutting devices, (to be hereinafter described,) and is provided with an inclosed notch or slot, *k*, for the purpose of holding the wire while this is being cut.

Into the second groove, *h*, of cam H works a friction-roller pin, *g*, projecting downwardly from the end of lever L, which has its fulcrum at *l* in a plate, *e*, secured upon and between the cross-pieces A^3 A^4. To the other end of lever L is pivoted a rack-bar, M, which passes forward about parallel to rod K, and operates the wire twisting and cutting device.

In the third groove, *i*, in cam H works the pin *d* of the upright lever or rock-shaft N, the lower end of which is pivoted in a bearing, *c*,

on the under side of bar A^4, while its upper end is articulated upon a short connecting-rod, n^1, pivoted to one side of the oscillating bar O, the rear end of which is pivoted on the under side of the end piece, A^2, while its forward end is pivoted in a slotted slide, P, having a finger-hook, *p*.

The device for holding, twisting, and cutting the wire is located in a box on the under side of the cradle-plate A^1, and of which this forms the top or cover. This box is divided by a plate or diaphragm, *b*, into two parts, the upper part containing the twisting and cutting device, the lower compartment the mechanism for operating this, and the projecting edge of the dividing-plate *b* bent to form the guide-sleeve or sheath for the notched bar K.

The twisting and cutting of the wire are performed by a single device consisting of two co-operating parts, and shown in detail in Figs. 9, 10, 11, and 12 of the drawings, Fig. 9 representing a top plan, Fig. 10 a vertical axial section, and the two remaining figures perspective views, of my combined twister and cutter, with its parts together and detached from each other, so as to clearly show their construction and combination.

From these figures it will be seen that my combined twister and cutter consists of a segmental plate or disk, B^2, the curved or sickle-shaped toe *m* of which has a sharpened concave edge to form the cutter for severing the wire after this has been grasped by the jaws of the twister, while its opposite end is bent upward to form a shoulder, *n*, the edge of which is again bent or set at a right angle, and provided with a serrated or file edge, so as to form one of the biting-jaws of the twister. This segmental disk B^2 is pivoted loosely upon a short vertical shaft, *o*, provided with a pinion, *q*, which engages with the rack-bar M. Rigidly secured upon the projecting end of shaft *o*, above the cutter-disk B^2, is the other part of the twister, which consists of a small plate, B^1, formed with a biting-jaw, n^2, corresponding to, and set opposite to, the raised jaw *n* of the disk B^2 below, and with a short projecting arm, *r*, the function of which will be stated in describing the operation of this part of my invention.

The cranked end, C′, of the shaft C is inserted through a slot, *s*, in a lever-arm, Q, which is pivoted upon the front side of cross-piece A^5. To the other end of lever Q is hinged the reciprocating compressor-bar R, which moves vertically through a slot or opening in the cradle-plate A^1.

The wire-carrier or "needle," as it is sometimes called, works at the front end of the crane-post B, and consists, essentially, of three parts—viz., the curved needle-bar S, its operating-crank T, and the guide-arm U, which projects laterally from the end of post B.

The crank T is secured upon the forward end of, and rotates in the direction of the arrow with, shaft G, its end being pivoted in the needle-bar at *t*. The rear end of the needle-bar is pivoted upon a slide, *u*, which slides upon the guide-arm U, so that, by this combination of parts, when shaft G is rotated the needle-bar or wire-carrier S will have a complex ellipsoid motion, as indicated in dotted lines in Fig. 2.

The spring take-up and tension consists of a tubular bar or sleeve, V, secured rigidly upon the front end of a short bolt or round bar, *v*, hung in bearings upon one side of the crane-post.

This bolt *v* is operated by a spring, *v′*, so as to cause bar V to press against a friction-roller, *w*, pivoted upon the end of a short upright or bracket, w^1, and which limits lateral motion or throw of the tension-bar in the direction of the projecting guide-arm U, while motion in the opposite direction is unobstructed. Inserted into the tubular arm V is a sliding arm, W, provided at its lower end with a spur, w^2, which projects out through a slot in bar V and works against friction-roller *w*, as shown more clearly in Fig. 2. Y is a small sheave block or plate, affixed upon the forward end of the horizontal arm of post B, a little back of the tension-bar; and X is a post for holding the reel of wire, which, as in the drawings, may be located upon the rear end of the crane-post, or at any other convenient point.

The operation of my improved grain-binder is as follows: The wire from the spool or reel is first carried through the guide-sheave Y, and then up through the eye in the point of the adjustable tension-bar W, and down through the eye in the point of the curved needle or wire-carrier S. In operating the machine, that portion of the wire which passes from the tension-bar down to and through the needle will be gradually tightened by the tension device, and when the point of the needle passes below or under the finger-hook *p* of the slide P, the wire, slipping past the rounded shoulder of the hook, (see Fig. 9), will be caught by this, and by it carried in under the cradle-plate A^1, upon which the gavel has meanwhile been delivered. To admit of the passage of the wire carried by the finger-hook *p*, the cradle-plate A^1 is slotted in a line with the needle or carrier S, as indicated at *a′* in Figs. 4 and 10, thus enabling the wire to pass the front edge of the cradle-plate, and be carried in under this into or between the jaw formed by the parts *n* n^2 of the twisting and cutting device, which is open to receive it, as shown more clearly in the enlarged views, Figs. 9, 10, and 11. At this point, which is when the needle has reached its farthest forward throw, or is in the position indicated in Fig. 3, the rack-bar M commences its forward motion, turning pinion *q*, with which it engages, and with it the upper twister-plate, B^1, the shoulder *r* of which, striking against the raised shoulder *n* of the plate B^2, which is pivoted loosely on shaft *o* below the upper plate, B^1, will throw this forward, causing the serrated jaws *n* n^2 to meet and firmly clamp the wire which has been inserted between them by the finger-hook *p* and needle S. The rack-bar M causes pinion *o*

and plate B^1, after both ends of the wire have been firmly grasped, to make a half revolution by the time that the slot *k* in the reciprocating bar K is opposite to the wire, and the lower end of the wire, passing into this slot, is caught between it and the sleeve or sheath *a*, through which bar K reciprocates. The next step is to cut the wire, which is done by the cutter *m* of plate B^2 while the wire is held by bar K, as described, and after the wire has been cut both ends are twisted by the continued revolutions of shaft *o*, with its plates B^1 B^2, so as to make a firm knot. By this time bar M has reached the end of its forward throw, and the compressor-bar R, which is operated by the lever Q and crank C′, is in its depressed position below the cradle-plate, so as to admit of the discharge of the sheaf.

By the construction and arrangement, as herein described, of the combined twisting and cutting device B^1 B^2 there is absolutely no waste of wire, the wire being cut so close as to leave ends only long enough for twisting.

The twisting and cutting device, being located in a closed box beneath the cradle-plate, is not liable to get out of order, or to become choked up with dirt and dust, as in cases where the twister is located in the head or eye of the needle-bar.

With the exception of the needle or wire-carrier, the tension, and the compressor-bar, all the operating parts are located beneath the cradle-plate, and may be inclosed, for the greater part, in a closed box or case attached to the under side of the cradle.

It is obvious that, in its application to harvesters of different kinds, this machine is susceptible of modifications in the details of its construction and arrangement of parts, and it is not meant that the drawings should illustrate the actual appearance of the machine, but merely the construction and combination of the several operating parts which form the subject of my invention and claims.

Having thus fully described my improvement, I claim and desire to secure by Letters Patent of the United States—

1. The combined twisting and cutting device herein shown and described, consisting of a plate or disk, B^1, keyed or otherwise firmly secured upon a rotating shaft, *o*, and armed with a jaw, n^2, and shoulder *r*, which operates in conjunction with another plate or disk, B^2, pivoted loosely upon the said shaft *o*, and provided with a raised part, *n*, bent so as to form a jaw, and a cutter, *m*, the parts B^1 B^2 being so arranged upon the shaft *o* relative to each other that the former will operate the latter, substantially as described, in the manner and for the purpose set forth.

2. In a grain-binder, a take-up composed of a pivoted tubular or hollow section, V, operated by a spring, *v*′, and extensible section W, sliding within the hollow section V, substantially as and for the purpose set forth.

3. The herein-described automatic spring take-up, consisting of the following elements, to wit: pivoted arm V, operated by the spring *v*′, sliding arm W, provided with the spur w^2, and friction-roller *w*, constructed and combined to operate substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

LEWIS OLSON BREKKE.

Witnesses:
WILLIAM HENRY MANNING,
ANDREW GULLIKSON.