(No Model.)

J. AUGSPURGER.

Grain Binder.

No. 238,327. Patented March 1, 1881.

Fig. 1

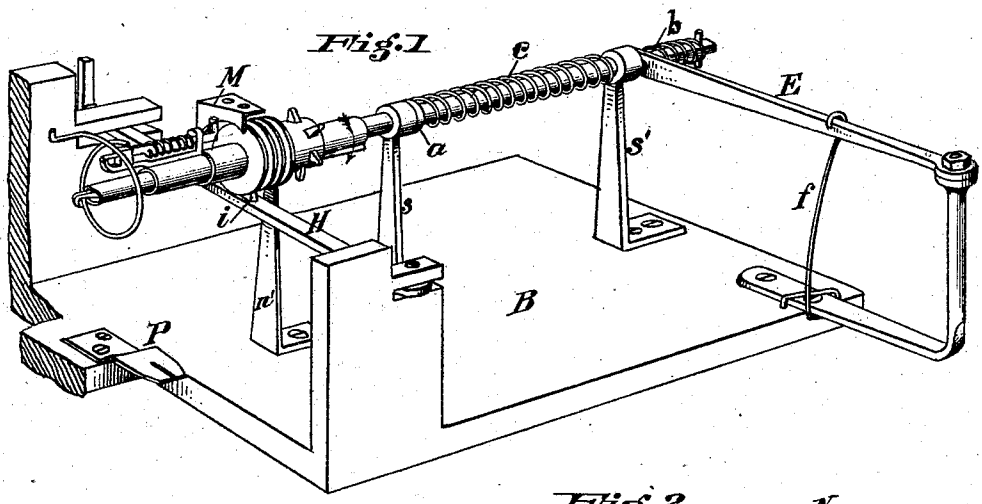


Fig. 2

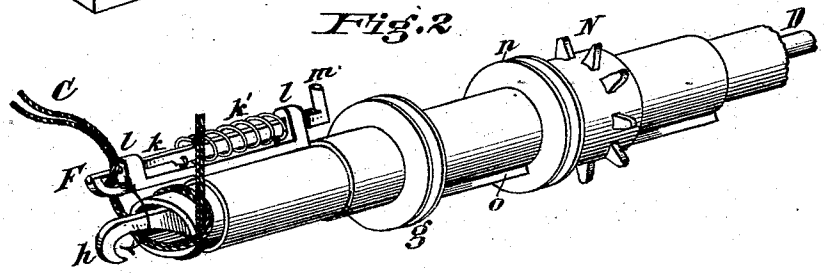


Fig. 3

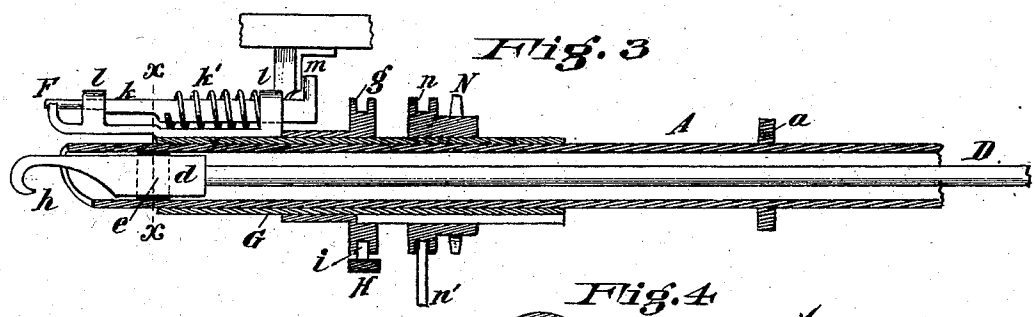
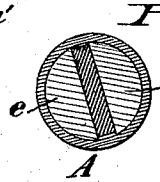


Fig. 4



Attest:
Edgar J. Goss,
Harry Gross.

Inventor:
John Augspurger,
by L. M. Hoover,
Attorney.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN AUGSPURGER, OF TRENTON, OHIO.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 238,327, dated March 1, 1881.

Application filed April 22, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN AUGSPURGER, a citizen of the United States, residing at Trenton, Butler county, Ohio, have invented new and useful Improvements in Grain-Binders, of which the following is a specification.

My invention relates to that class of knot-tying devices for binders designed especially for the use of twine in which a tube is employed as a mandrel, around which the twine is wound to form a loop, through which the ends are drawn by a sliding hook, which forms the knot; and it consists in the combination and arrangement of parts, as hereinafter more fully set forth.

My invention is embodied in mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my invention with the grain-table removed; Fig. 2, an enlarged perspective view of the tube and its connecting parts, showing the cord in position during the operation of tying; Fig. 3, a vertical longitudinal section of the tube; and Fig. 4, a cross-section of the tube through the internal stops.

Similar letters of reference indicate similar parts throughout the drawings.

A indicates a metal tube, of suitable size, secured beneath the grain-table in supports attached thereto.

For clearer illustration I have shown the parts supported upon a platform, B, which may or may not be arranged as part of the working machine. The supports *s s'* therefor are shown as projecting upward from the platform B. A fixed collar, *a*, upon the tube A, adjacent to one of the supports, *s*, prevents the tube from moving outward, while a coiled spring, *c*, between the collar *a* and the support *s'*, offers a yielding impediment to its movement in the contrary direction.

Within the tube A is a bar, D, extending entirely through its length, provided at its near end with a square head, *d*, having a hook, *h*, at its extremity, which ordinarily projects slightly from the end of the tube A. Within the tube A, near the end, are secured semi-cylindrical blocks *e*, between which the squared head *d* of the bar D has a longitudinal movement. The remote projecting end of the bar D is squared and embraced in a rectangular aperture at the end of a lever, E, pivoted to the grain-table or to the lower platform, B. Between the lever E and the end of the bar D is a short spiral spring, *b*, secured against a pin at the end of the bar, for a purpose hereinafter set forth. A spring, *f*, holds the lever E, and, by consequence, the bar D, ordinarily in such position that the hook *h* projects from the other end of the tube A, as stated; but when the lever is drawn to the right the hook *h* is drawn within the tube A and between the blocks *e*, for a purpose presently to appear. The connection of the bar D with the lever E, as will be obvious, prevents rotation of the bar D and the squared head *d* of the bar; and the blocks *e* of the tube also prevent rotation of the tube, while a free longitudinal movement of both is permitted, except as hereinbefore explained.

The device by which the cord is looped over the tube A consists, mainly, of a catch-hook, F, secured to a short section of tube, G, mounted upon the main tube A and rotating freely about it. The tube G is provided with a sheave or guide-wheel, *g*, beneath which a lever, H, having a horizontal movement and provided with a tooth, *i*, entering between the flanges of the guide-wheel *g*, is arranged to guide and adjust the position of the tube G. The catch-hook F is provided with a sliding bar, *k*, sliding in supports *l l*, and ordinarily held in position to cover and close the opening of the hook F by a spiral spring, *k'*, secured at one end to the bar *k*, and resting against the guide-supports *l* at the other, so that when the bar is drawn back the resiliency of the spring restores it to the position shown. The remote end of the sliding bar *k* is turned up into a finger, *m*, which, when the tube G and catch-hook are rotated, engages at the proper time against a suitably-disposed cam-plate, M, projecting below the grain-table, and withdraws the sliding bar *k*, leaving the hook open for a short interval until the cam-plate is passed and the spring *k'* restores the bar to position. The tube G and catch-hook are rotated by a cog or sprocket wheel, N, which has also a guide groove, *n*, in which a finger, *n'*, secured upon the platform B rests and prevents lateral displacement. The tube G has a free longitudinal movement in the wheel, but is compelled to rotate with it by a

feather, O, on the tube and corresponding groove in the wheel.

The operation of my device is as follows: The cord C being looped about the bundle of grain upon the grain-table by the due operation of a needle-bar, its two ends are brought together below the tube A, by the end of which the two end sections together pass vertically and are guided into the jaw of the cutting-plate P, where they are held by suitable devices. The catch-hook F is then caused to rotate in the direction shown by the arrow, Fig. 2. As it nears the cord the finger *m* engages with the cam-plate M, which draws back the sliding bar *k*, thus opening the hook and allowing the cords to be caught and held after the disengagement of the sliding bar *k*. At this time, also, the cord is cut at P by suitable devices, and the catch-hook continuing its rotation the cord is wound entirely around the tube A. After making an entire revolution and passing by the upper portion of the cord, the catch-bar is moved forward by the action of the lever H and guide-finger *i*, and thus brings the cord across the end of the tube A and the loop formed thereon, and within the projecting hook *h*, as shown in Fig. 2. At this stage its rotation ceases, and the hook is drawn within the tube by the lever, drawing the ends of the cord with it until its relative movement is stopped by the blocks *e*, when the tube itself is drawn in the same direction against the force of the spring *c*. This movement withdraws the tube from the cord looped about it, which thus slips over the end of the tube, and by the continued travel of the rod and tube forms a knot. The spring *b* at the end of the rod prevents the cord from being cut or injured by the stops *e* when drawn between them by the hook *h*. It also allows the end of the cord to disengage itself entirely from the tube and hook. When this is done the parts resume their original position for a repetition of the same movements.

The driving mechanism by which these movements are produced and the knot-tying devices operated have been but partially indicated herein, it being my intention to describe the same more fully in a separate application for Letters Patent.

Having fully described my invention, I claim and desire to secure by Letters Patent—

1. The combination of the longitudinally-yielding tubular mandrel A, provided with internal blocks, *e*, the non-rotating reciprocating rod D, having an angular head, *d*, guided between said blocks, and provided with the hook *h*, the rotating and reciprocating sleeve G, provided with the catch-hook F and guides *l*, and the reciprocating spring-actuated bar *k*, arranged in said guides for opening and closing the catch-hook, all substantially as shown and described.

2. The sleeve G, provided with guide-wheel *g*, and carrying the catch-hook F, in combination with the feathered driving-wheel N, guide-wheel *n*, and guide-tooth *n'*, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN AUGSPURGER.

Witnesses:
L. M. HOSEA,
C. F. HESSER.