O. O. STORLE.

Grain-Binder.

No. 223,614. Patented Jan. 13, 1880.

Fig. 1.

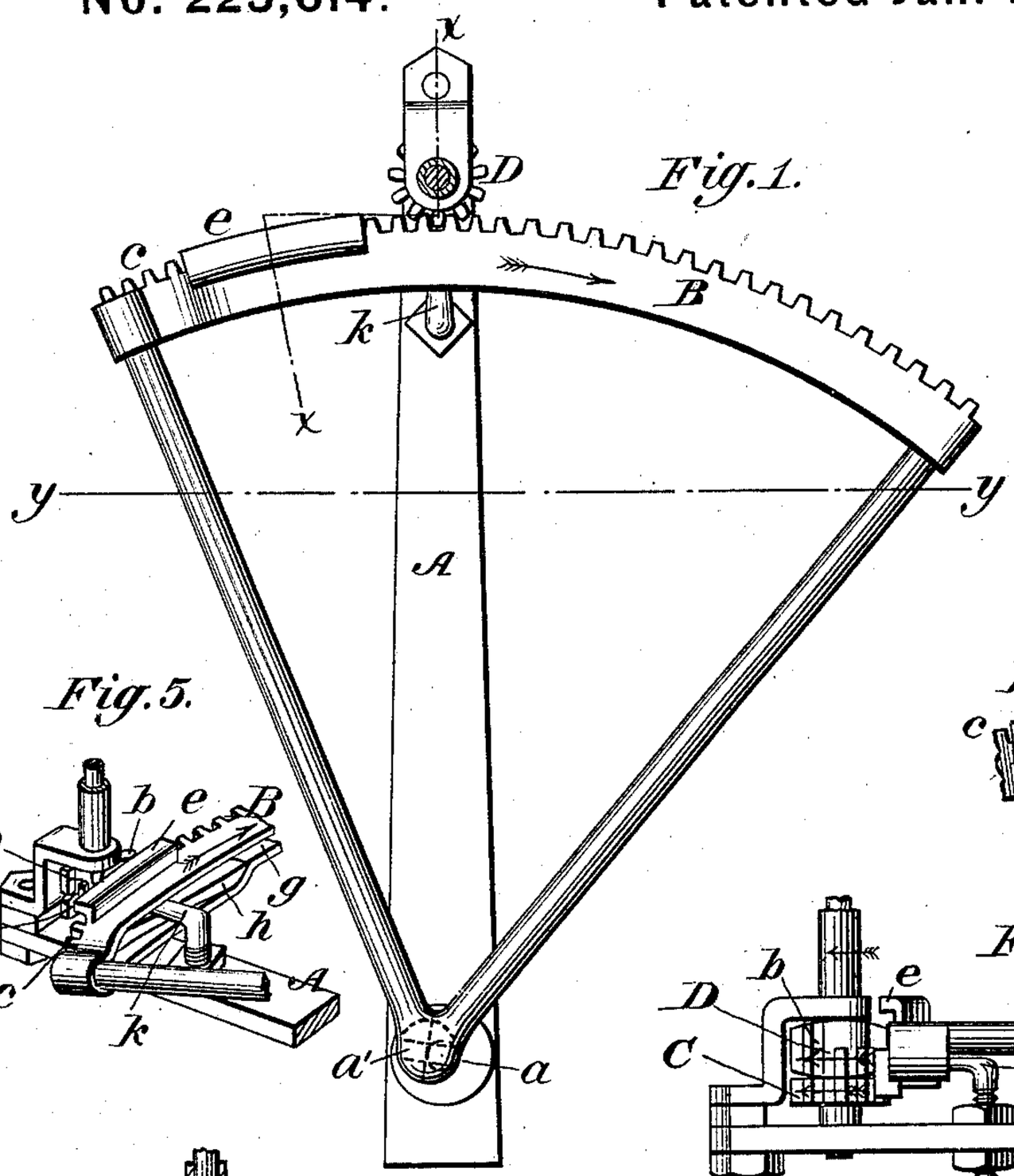


Fig. 6.

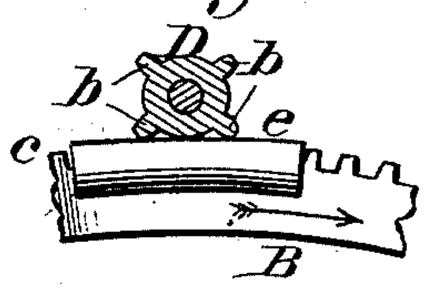


Fig. 5.

Fig. 7.

Fig. 2.

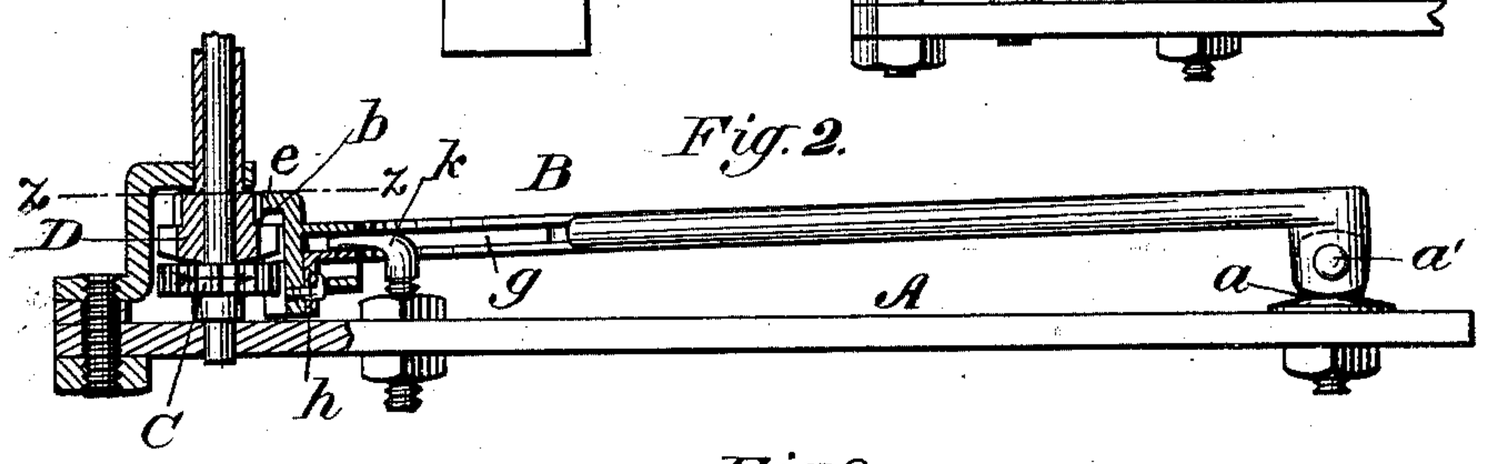
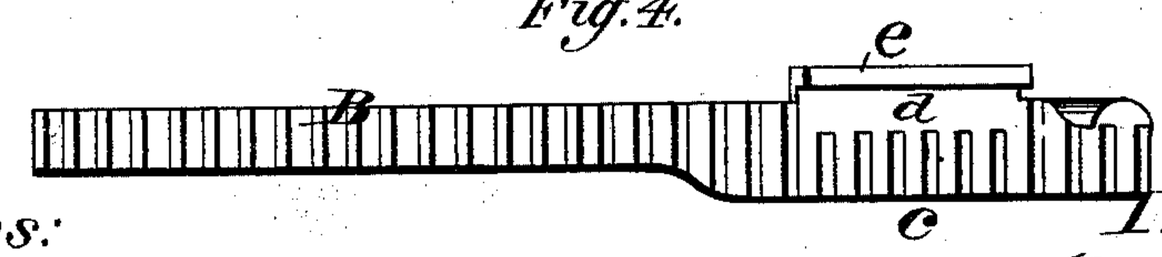


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

OLE O. STORLE, OF MILWAUKEE, WIS., ASSIGNOR, BY MESNE ASSIGNMENT, TO JOHN H. GORDON, OF ROCHESTER, N. Y.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 223,614, dated January 13, 1880.

Application filed May 28, 1878.

To all whom it may concern:

Be it known that I, OLE O. STORLE, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain Improvements in Grain-Binders, of which the following is a specification.

My invention relates to improved means for actuating the rotary band-fastening mechanism of automatic grain-binding machines, more particularly that class of mechanism containing two or more pinions, by or through which the band is clamped, twisted, and cut, and which require to be actuated part of the time in unison, and the remainder of the time independently, as shown, for example, in the Letters Patent granted to me on the 17th day of July, 1877, numbered 193,287.

The invention consists, primarily, in combining with the pinions an operating-rack, mutilated and provided with a blank delay-surface, and arranged to have, in addition to the usual reciprocation, a transverse shifting movement to throw the mutilated and plain portions into and out of action; and, secondly, in the construction and arrangement of details, as hereinafter specified.

The drawings represent my invention embodied in a pivoted vibrating rack, but it is applicable in like manner to a straight reciprocating rack, and is susceptible of various other changes of detail.

Figure 1 represents a top-plan view of my mechanism; Fig. 2, a cross-section of the same on the line *x x;* Fig. 3, a section on the line *y y*, looking against the rear side or face of the rack; Fig. 4, a face view of the rack; Fig. 5, a perspective view of the pinions and the mutilated end of the rack; Fig. 6, a horizontal cross-section on the line *z z* of Fig. 2; Fig. 7, a side elevation with the parts in the position shown in Fig. 1.

Referring to the drawings, A represents a supporting frame or bar; B, a vibrating sector-rack, swinging horizontally upon a vertical axis, *a*, on the frame A, and also capable of limited vertical play upon a horizontal pin, *a'*, by which it is connected to axis *a;* and C D are the two concentric pinions, mounted on the frame one above the other, and arranged to engage with the teeth of the rack. The lower pinion, C, is of ordinary form, and has a shaft or spindle extending upward through a tubular shaft or sleeve of the upper pinion, the two shafts being designed to receive upon their upper ends the cutting and clamping parts of the twister or tier head. The upper pinion, D, has teeth of ordinary form, and also has on top four extra teeth, *b*, at equal distances apart, to serve as stops to hold the pinion, as hereinafter explained.

The rack is made, as shown in Fig. 4, with teeth throughout its entire length of sufficient width to engage with and drive both pinions; but near one end the teeth are offset or thrown to one side, as shown at *c*, leaving a blank space, *d*, so that if the rack is carried directly forward without being moved sidewise the upper pinion, D, will pass above the offset teeth opposite the blank space *d*, and cease to be rotated, while the lower pinion will remain in gear and continue to turn.

Above the blank space *d* there is formed, on the edge of the rack, a plain overhanging flange or detaining-surface, *e*, the office of which is to engage with the extra teeth *b* and hold the pinion D from turning when it is disengaged from the teeth, as above described.

In the back of the rack there is formed a longitudinal groove, *g*, one end of which, behind the portions *d e*, is widened and curved downward, and in this widened portion there is pivoted a switch, *h*, acted upon by a spring, *i*, which holds it normally in the position shown in Fig. 3.

To the frame or bar A there is secured a fixed arm, *k*, one end of which enters the groove *g*, as shown, so as to sustain and guide the rack, and, by means of the switch, shift it vertically at the proper times.

In operation, the rack vibrates horizontally from end to end past the pinions. Supposing the rack to move first toward the right in Fig. 1, the teeth engage with and turn both pinions together until the mutilated point *c* is reached, when the upper pinion, D, rides into the blank space and ceases its motion, while the lower pinion, C, remaining in gear, continues its motion, as indicated in Fig. 2. At the instant that the pinion D enters the blank space and ceases to rotate it is locked and held

from turning by means of the flange or detaining-surface *e*, which acts against and slides upon two of the extra teeth of the pinion, as shown in Figs. 5 and 6. The pinion C continues to turn and the pinion D remains still until the end of the flange *e* is reached, whereupon the rack again engages and turns the two pinions together a part of a revolution. As this last action takes place and the rack completes its movement the arm *k* enters the depressed end of the groove, passing below the end of the switch, which closes behind it, and elevating the rack, as shown in Fig. 7, so as to lift the flange or detent *e* above the stop-teeth of the pinion and cause the engagement of the rack with both pinions. The reverse motion of the rack immediately follows, and during the entire movement its teeth remain in gear with and turn both pinions, the offset portion of the teeth acting until the switch has passed over the arm *k*, when the rack descends so that the pinions are driven by the main or straight portion during the remainder of the movement.

Thus it will be seen, to recapitulate, the movement of the rack toward the right causes the two pinions to turn together, then causes the upper pinion to stand still while the lower one continues to turn, and finally turns the two together again; and then, as the rack reverses its motion and moves to the left, it turns the two pinions in unison during its entire movement.

It is obvious that the length of the offset or mutilated portion and of the flange may be varied as required; that the switch may be modified, and that the other details may be changed, provided the rack is arranged to shift laterally to change its action on the pinions.

Having thus described my invention, what I claim is—

1. The combination of the two pinions and the driving-rack, having mutilated or offset teeth, and means, substantially such as shown, for shifting the rack laterally, so that during the movement in one direction both pinions shall remain in gear, and during the movement in the other direction one pinion shall pass over the mutilated portion and cease its rotation.

2. The combination of the pinion C, pinion D, having teeth or stop-surfaces *b*, and the reciprocating and laterally-shifting rack provided with the offset teeth *d* and flange or delay-surface *e*.

3. The combination of the two pinions, the rack having its face constructed as described, and its rear side provided with the groove and switch, and the finger *k*, seated in the groove.

4. A mutilated vibrating rack, substantially such as described, connected by a transverse pivot to its axial shaft, in combination with two pinions, and means, substantially such as shown, for shifting it laterally.

5. The combination of two pinions and a mutilated operating-rack, arranged to move past the pinions in different planes or different relations thereto during its movement in opposite directions, whereby it is caused to impart to one pinion a greater rotation in one direction than in the other.

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Witnesses:
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