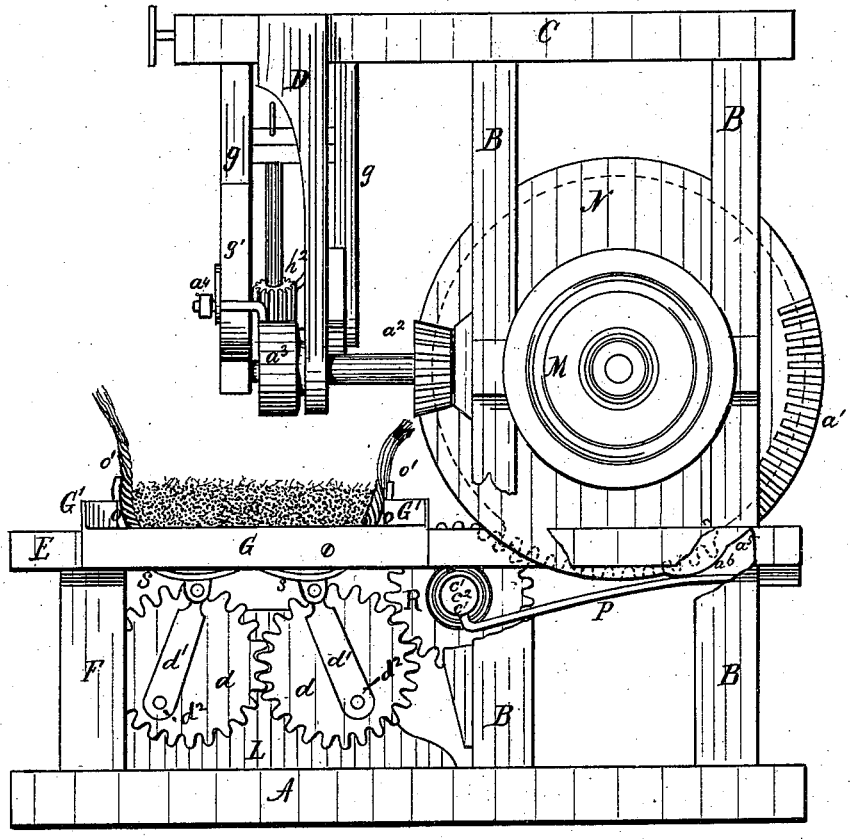
5 Sheets—Sheet 1.

D. W. BARNETT.

GRAIN-BINDER.

No. 183,529. Patented Oct. 24, 1876.

Fig 1.



Witnesses.
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A. B. Coun

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by R. S. & A. P. Lacey
his attorneys.

5 Sheets—Sheet 2.

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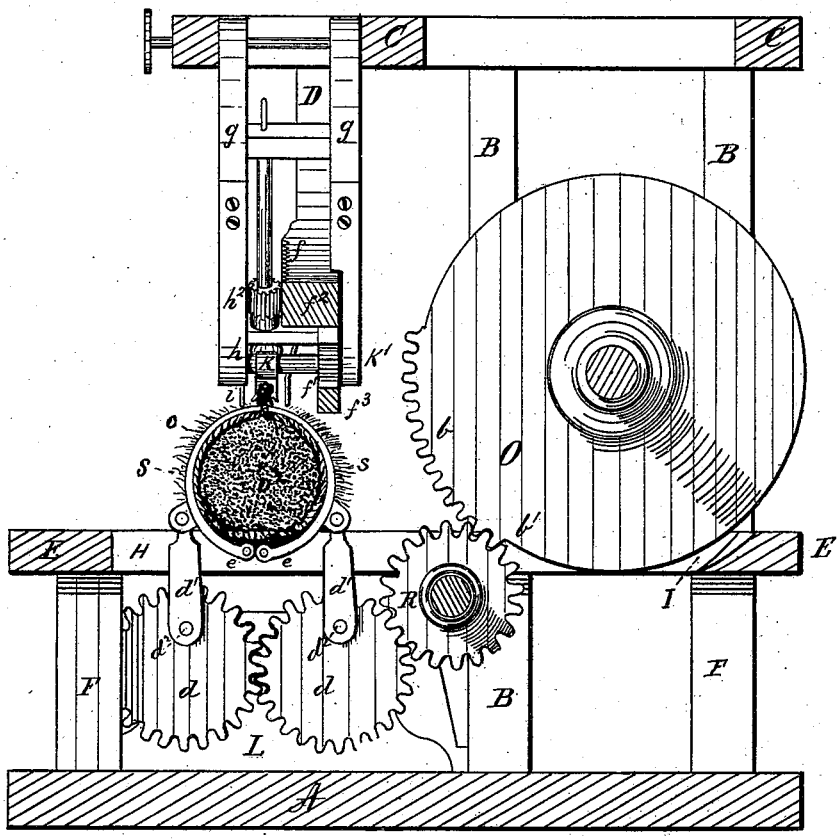
Fig 2.



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5 Sheets—Sheet 3.

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Fig 3.

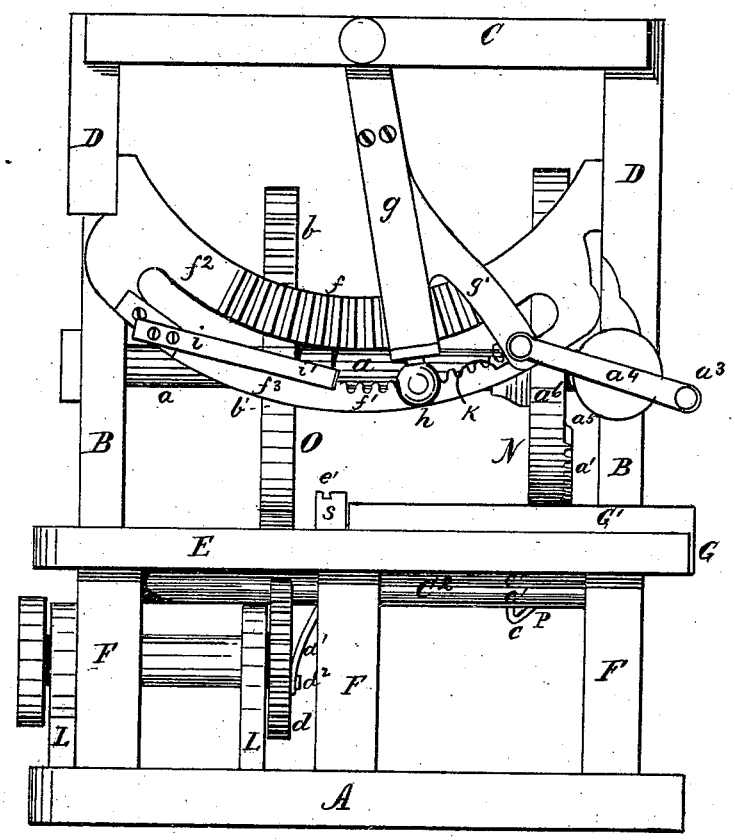


Fig 6

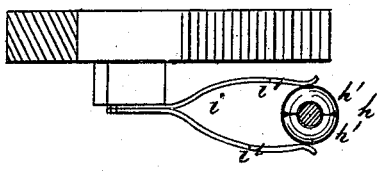
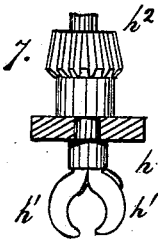


Fig 7.



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5 Sheets—Sheet 4.

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Fig 4

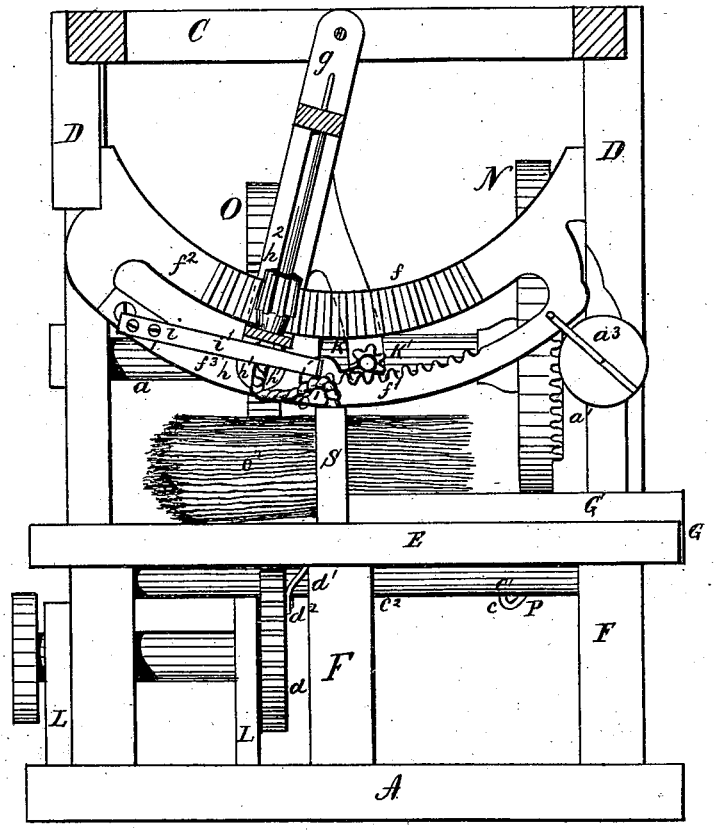
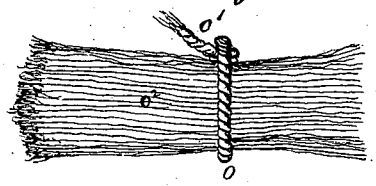


Fig 8.



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5 Sheets—Sheet 5.

D. W. BARNETT.

GRAIN-BINDER.

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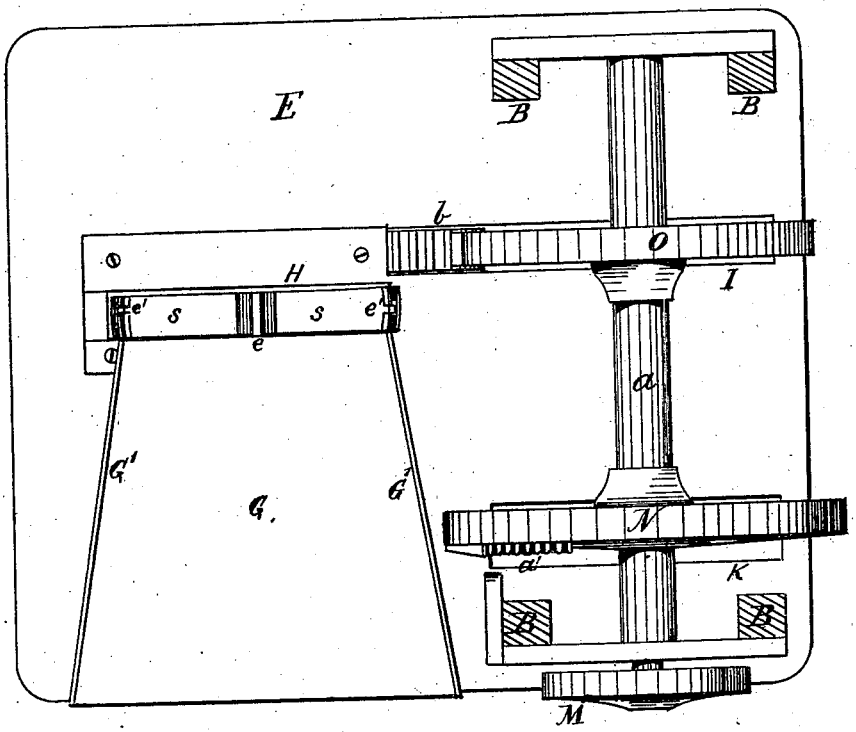
Fig 5.



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UNITED STATES PATENT OFFICE.

DAVID W. BARNETT, OF CADIZ, OHIO.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **183,529**, dated October 24, 1876; application filed June 22, 1876.

To all whom it may concern:

Be it known that I, DAVID W. BARNETT, of Cadiz, in the county of Harrison and State of Ohio, 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 thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in that class of grain-binding machines in which a wisp of straw or of the cut grain is used for a band for the bundle or gavel.

The nature of my invention will be fully understood by reference to the accompanying drawings and description.

In the drawings, Figure 1 is a side elevation with a portion of the frame removed. Fig. 2 is a vertical longitudinal section. Fig. 3 is a front elevation. Fig. 4 is a front elevation, with some portions of the frame and operating parts removed. Fig. 5 is a top view of the binding-platform. Figs. 6 and 7 are detail views of parts of the machine; and Fig. 8 is a sheaf of grain tied by my machine.

A is the base or foundation framing-piece, in which is tenoned the vertical posts B, which support the horizontal top frame C, to which are secured the downward-projecting arms or supports D. E is the grain or binding platform, supported by the posts B and standards F. It is above the base A a sufficient distance to give space for the attachment and operation of the gearing hereinafter described. On it is placed the sheet-metal guide-platform G, which is constructed with the flanges or guides G′, which converge to the gavelers, and gather the grain sufficiently compact to be received by said gavelers. H, I, and K are slots or mortises cut through the platform E in order to permit the proper connection being made between the upper and under operating parts of the machine. L L are two supports, secured to the base A, for providing bearings for part of the under gearing.

The frame hereinbefore described is attached by any suitable means to the harvester, so that the platform G′ will be on a level with and against and receive from the platform of said harvester the grain as thrown off by the rake. M is the driving-pulley on the end of the main driving-shaft *a*, which is journaled in the posts B, and on which shaft is secured the actuating-wheels N O, which are made blank—that is, without cogs, except a short segment on the periphery of each. It is put in revolution by any suitable intermediate mechanism from the power that operates the harvester.

N is the actuating-wheel, by which the mechanism for twisting and tucking the band on the bundle or sheaf is operated. It is provided on its side and flush with the periphery with the cog-rack a^1, which engages with and is in length just sufficient to give one full revolution or turn to the pinion a^2, on the shaft of which is the crank a^3 and pitman or arm a^4 for operating the oscillating frame, which carries the twisting and tucking devices. On its periphery, and just forward of the end a^5 of the rack a^1, is placed the cam a^6, which, in the operation of the binder, disengages the pawl from the ratchet or stops on the shaft of the intermediate gear-wheel, hereinafter explained.

The wheel O is provided on its periphery with the cog-rack or segment *b*, arranged so that its rear end b' will be in the same horizontal line with the front end a^5 of the rack a^1. The segment *b* engages with, and in each full revolution of the wheel O turns, the intermediate gear-wheel R only one-half of a full revolution.

P is a pawl, having one end secured to the frame, and has on its opposite end the catch or claw *c*, which catches on stops or ratchet-teeth, or in mortises c c^1 placed or formed on opposite sides of the axle c^2 of the intermediate gear-wheel R, so that the latter will be caught and stopped at each half-revolution. It is disengaged from its hold on the axle c^2 by the cam a^6 on the actuating-wheel N. R is the intermediate gear-wheel, the axle of which is arranged below the platform G, and journaled in the posts B. It is the connecting or intermediate gear-wheel between the actuating-wheel O and the crank-gears that oper-

ate the gavelers. It has double the number of cogs as are in the rack *b*, so that it will be turned only half round by each full revolution of the wheel O.

d d are two crank-gears, having a diameter and number of cogs equal to the intermediate wheel R. They are geared together and with the wheel R, with which they revolve correspondingly. They are provided with the arms or rods d^1 d^1 journaled at d^2, and secured by pivoted joints to the gavelers S S, which have their lower ends *e* pivoted close together and within the slot H in the platform E. It will be readily seen that the revolutions of each of the wheels *d d* R are always in the same direction, there being no reverse movements or revolutions, and that, by this continuous movement, the gavelers S S will be first closed to compress the grain, and then opened to permit the removal of the bound sheaf. e' e' are notches formed in the upper ends of the gavelers S S for receiving and retaining the ends of the band *o*. They are not formed so as to be opposite each other when the ends of the gavelers are brought together, but so that they will bring the ends o^1 of the band to cross each other above the closed ends. The band *o* is of the same material of the bundle o^2 to be bound.

A boy sits on the platform E near to the gavelers, and, having provided himself with a suitable wisp of the straw, puts the ends in the retaining notches e', the central portion being permitted to lie on the lower ends *e* of said gavelers. This being done, the operation of the harvester will deposit the bundle within the gavelers, and on the band, as shown in Fig. 1, where it will be bound, as hereinafter explained.

f f^1 are two cog-racks formed on the cross-bars f^2 f^3, which are curved downward to adapt them to the curved line of movement of the lower end of the oscillating frame hereinafter described. The upper rack *f* is formed on the front or outer side of the bar f^2, and the rack f^1 is formed on the upper side of the bar f^3. This arrangement of the racks is to adapt them to the position of the pinion-wheels which operate the twister and tucker hereinafter described, and the bars are arranged apart sufficiently to admit between them and permit the necessary play on the rack f^1 of the pinion which operates the tucker. The said bars extend across the front end of the machine, and are secured to the arms D.

g is an oscillating frame hinged to the top frame C, so that it may be swung back and forth along the rack *f* f^1 and over the gavelers S S. Within this frame, and in suitable bearings, are placed the small cog-wheels h^2 and k' arranged, respectively, to move on the racks *f* f^1. The cog-wheel k', which operates the tucker, is journaled in the arms g' of the frame *g*, in rear of the cog-wheel h^2, which operates the twister so as to give space for the revolution of the tucker immediately in rear of said twister.

The lower end of the axle of the cog-wheel h^2 is extended downward through its bearing in the frame *g*. To this extension is attached the twister *h* formed of the jaws h^1 h^1, which are held open by a spring suitably arranged between them. *i* is a clasp secured to the cross-bar f^3. It has the curved arms i' i', the free ends of which are arranged close together, and so as to receive and press together the jaws h^1 h^1 of the twister *h*, so as to grasp and hold the ends of the band until the latter shall have been twisted sufficiently, when the twisted ends are released and caught by the end of the tucker, and doubled under the band, as shown in Fig. 8.

k is the tucker secured to and revolves with the shaft or axle of the cog or pinion wheel k'. Its outer end is curved, so that when the frame *g* is thrown outward to its utmost limit by the crank a^3, it will turn down immediately under the closed ends of the gavelers, and under the band *o* around the sheaf o^2.

The operation of the machine is as follows: The machinery being in the position shown in Fig. 1, with the band *o* properly adjusted, and the grain o^2 within the gavelers, the wheel N will bring the cam a^6 to bear against the pawl P, and disengage the latter from the axle of wheel R, immediately after which the segment *b* engages the intermediate wheel R, turning it half round, which movement revolves the wheels *d d* a half-revolution, and brings the gavelers together, as shown in Fig. 2, with the ends of the band crossed. When the segment *b* has cleared the wheel R, the segment a^1 on wheel N engages the pinion a^2 and turns it one full revolution, which will move the frame *g* outward from the position shown in Fig. 3 to a point slightly beyond that shown in Fig. 4, and bring it back to the initial position of Fig. 3. In the outward movement of the frame *g*, the twister passes over and close to the closed ends of the gavelers S S, the crossed ends of the band *o* will be drawn into the jaws h^1 h^1 of the twister, which, immediately passing into the jaws of the clamp *i*, are pressed together sufficiently tight to hold the ends till twisted enough to be tucked under the band. At this moment the curved shapes of the jaws i' i' release their pressure on the jaws h^1 h^1, and the tucker *k*, coming over, catches the twisted end o^1, doubles it down and tucks it under, as shown in Fig. 8.

The binding of the bundle being completed, the wheel O again, in its further revolution, engages the wheel R, and opens the gavelers. The frame *g* is again thrown outward by the wheel N as in the act of binding, hereinbefore explained. By this second outward movement of the frame, the bundle o^2 is thrown from the platform by devices attached to said frame, but not shown.

The duplicate movement of the frame, as above explained, gives ample time for the preparation and adjustment of a band for the next sheaf.

It will be further seen that the pawl P stops

the wheel R at each half-revolution, and holds the latter securely, thereby preventing any movement of the gavelers out of proper place.

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

1. The combination, with the gavelers S S, of the gear-wheels d d, engaging with each other and arms or rods d^1 d^1, as and for the purpose set forth.

2. The combination, with the gavelers S S, gear-wheels d d, and arms or rods d^1 d^1, of the pawl P, and intermediate gear-wheel R, provided with the ratchet or stops c' c' on its axle, substantially as and for the purpose set forth.

3. The combination, with the gavelers S, arms d^1 d^1, gear-wheels d d R, ratchet or stops c' c', and pawl P of the actuating-wheel N, provided with the segment a^1 and cam a^6, substantially as set forth, and for the purpose specified.

4. The combination, with the actuating-wheel N, provided with the segment a^1, pinion a^2, crank a^3, and pitman a^4, of the twister, h pinion h^2, oscillating frame g, rack f, and clasp i, substantially as and for the purposes stated.

5. The combination, with the actuating-wheel N, provided with segment a^1, pinion a^2, crank a^3, pitman a^4, and oscillating frame g, of the tucker k, pinion k', and rack f, substantially as set forth, and for the purpose described.

6. The combination of the twister h, clasp i, tucker k, pinions h^2 k', and oscillating frame g, with the racks f f^1, pitman a^4, crank a^3, pinion a^2, and segment a^1 on the wheel N, supported and operated by the driving-shaft a, substantially as and for the purposes set forth.

7. The combination, of the gavelers S S, arms d^1 d^1, gear-wheels d d R, and pawl P, with the twister h, clasp i, tucker k, racks f f^1, pinions h^2 k', and oscillating frame g, substantially as set forth.

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

DAVID W. BARNETT.

Witnesses:
JAMES HAWARD,
JESSE L. CONNELL.