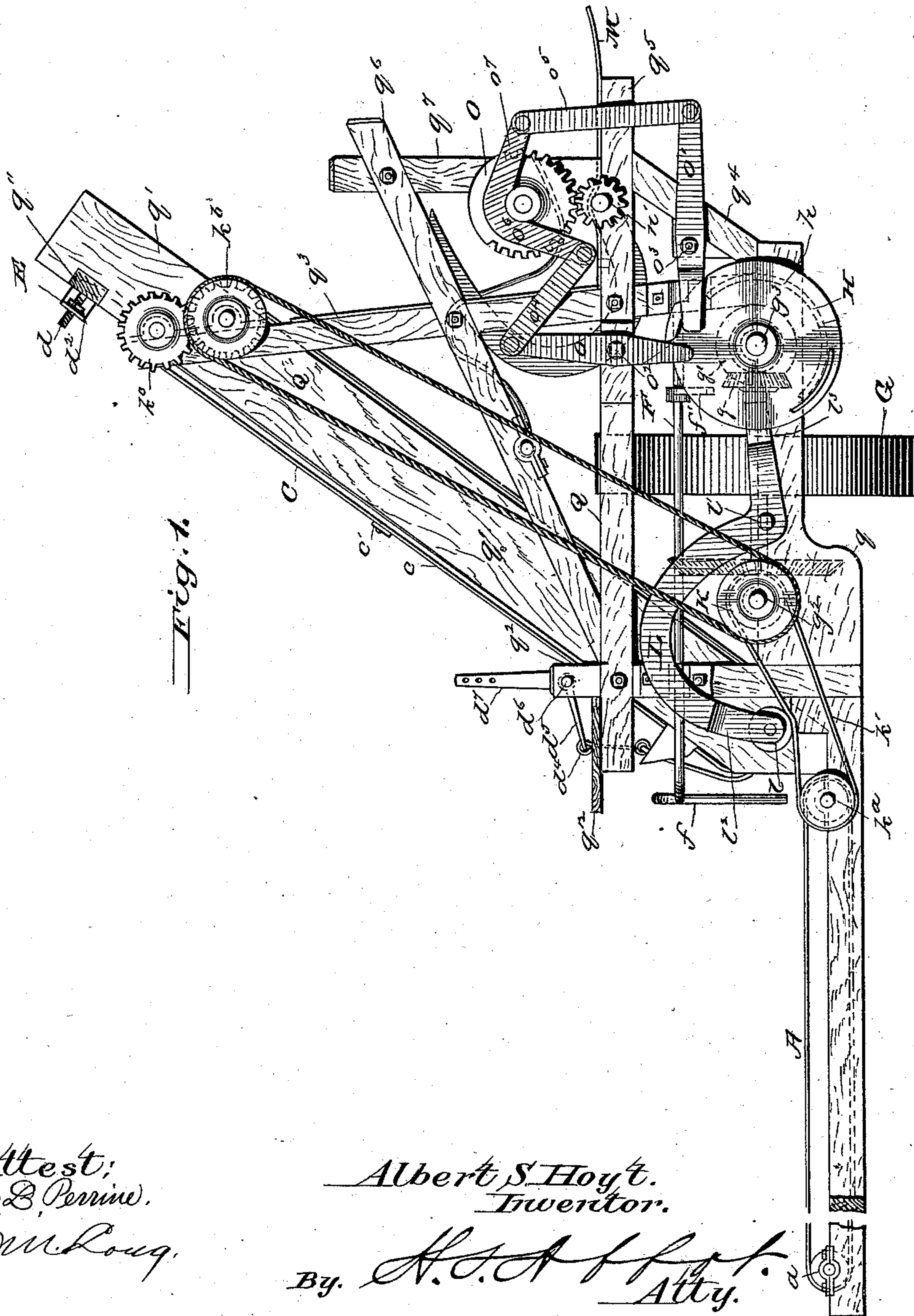


A. S. HOYT.  
Grain-Binder.

**No. 223,852.**

**Patented Jan. 27, 1880.**



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H. B. Perrine.  
Am. Long.

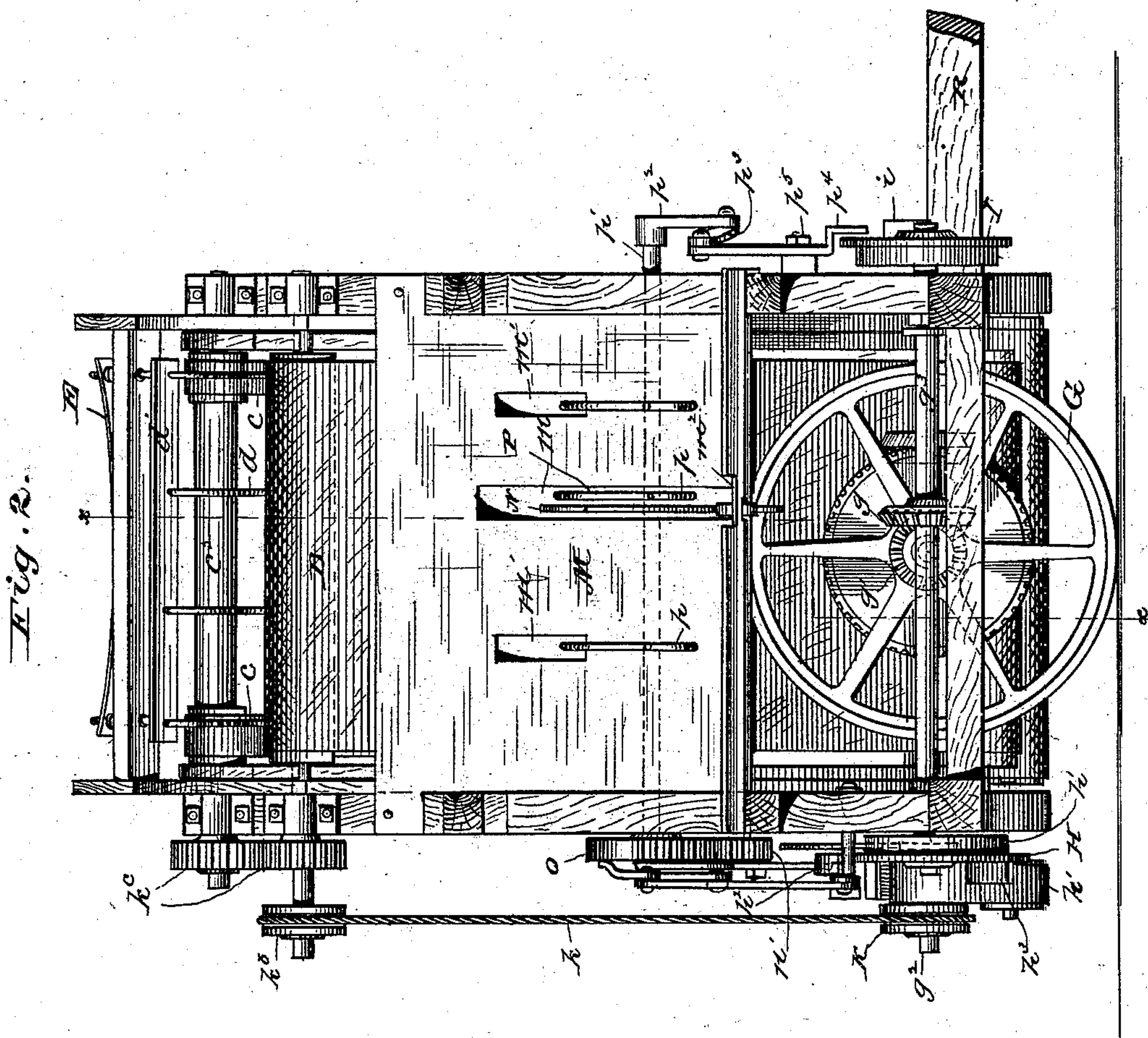
Albert S. Hoyt.  
Inventor.

By A. S. A. J. J. J.  
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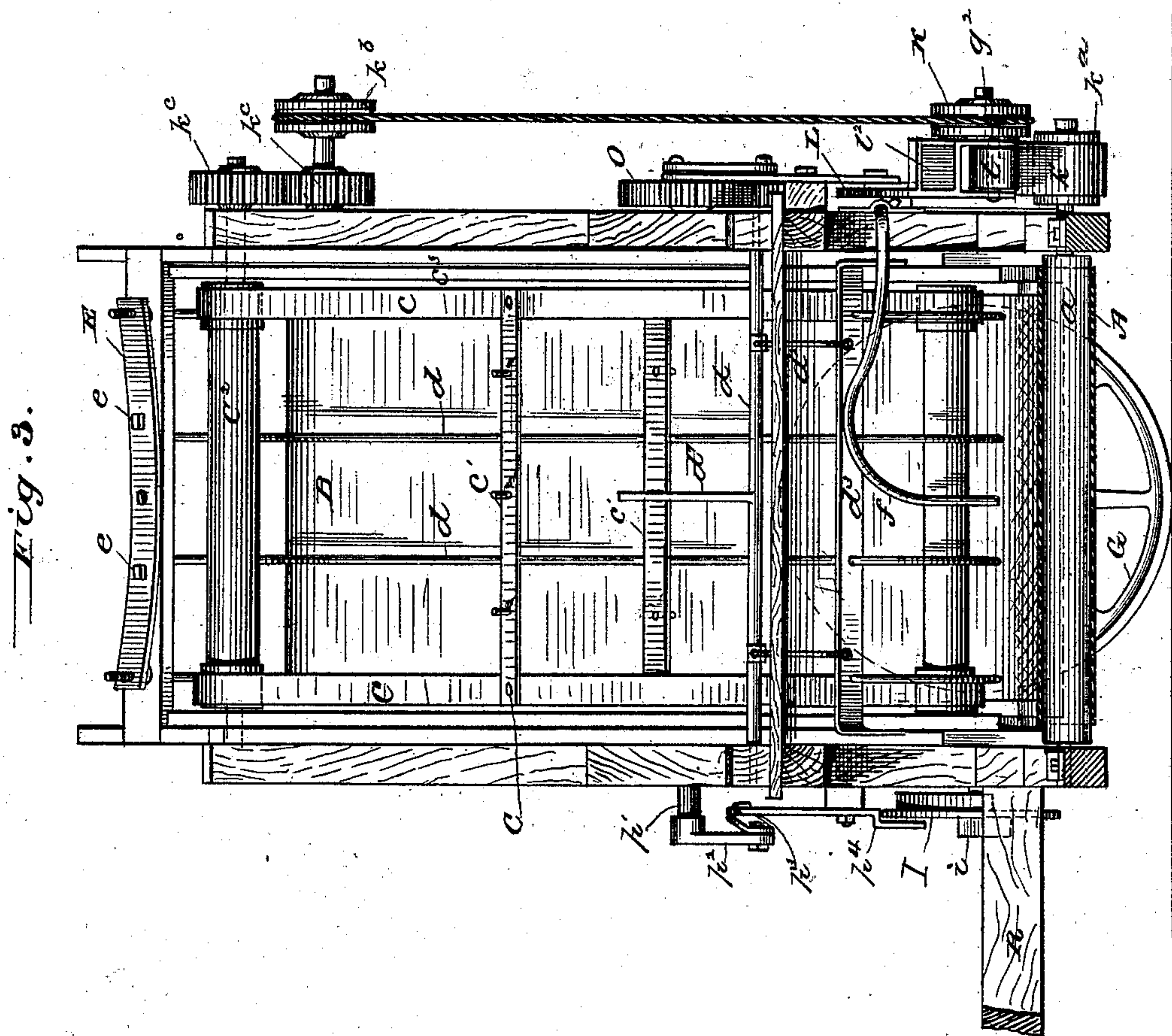
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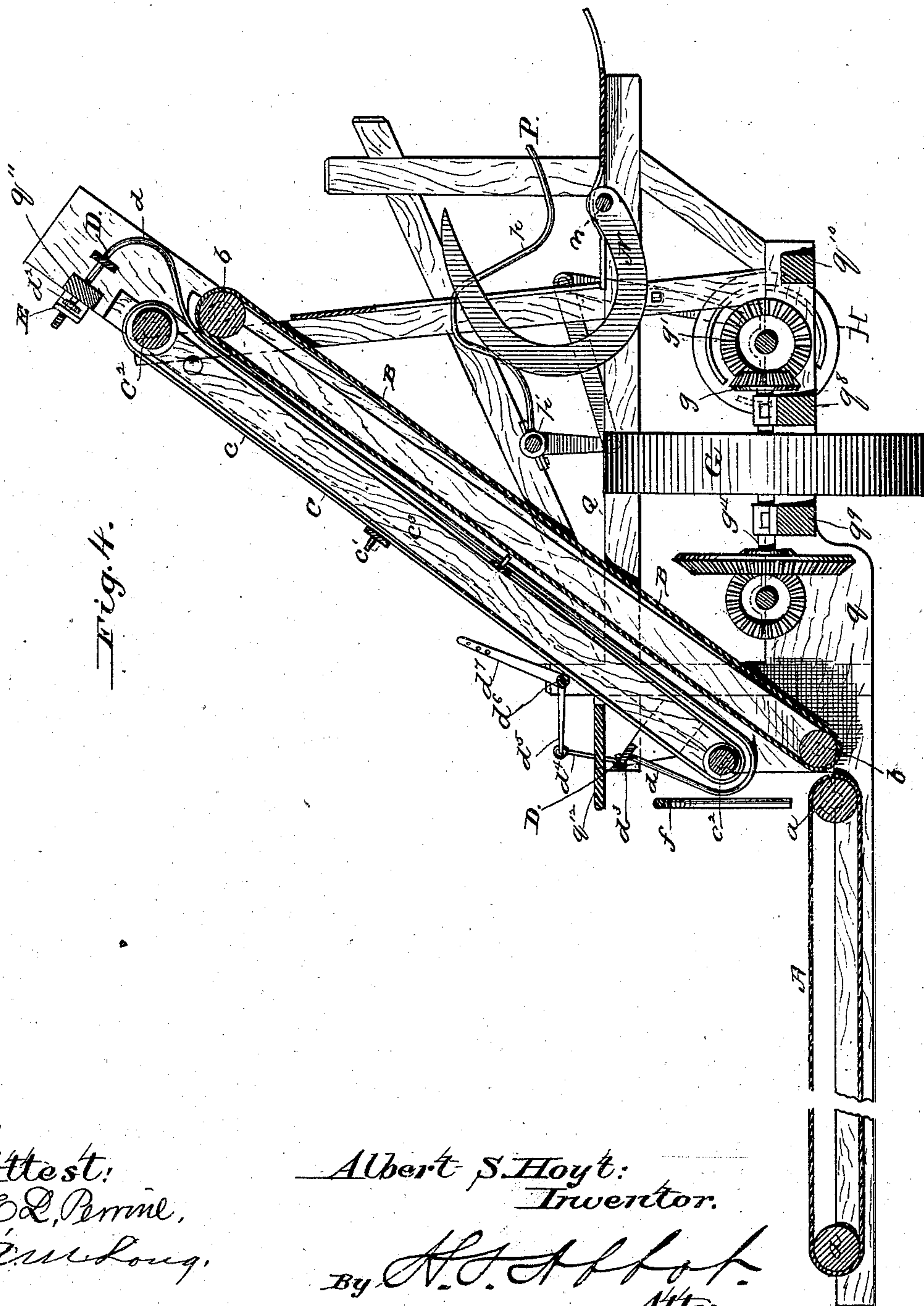


Fig. 4.

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By H. J. Hoff,  
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# UNITED STATES PATENT OFFICE.

ALBERT S. HOYT, OF CHICAGO, ILLINOIS.

## GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 223,852, dated January 27, 1880.

Application filed January 21, 1879.

*To all whom it may concern:*

Be it known that I, ALBERT S. HOYT, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful  
5 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,  
10 reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In binding grain on a harvester, either by hand or automatically, a difficulty occurs in the  
15 separation of the grain for one sheaf from that which is to form the next. The oblique manner in which the grain is delivered over the top of the elevator causes the straws to interlock and scatter badly while being bound and  
20 removed from the binders' table. By my invention this is obviated, a separation to facilitate the labor of binding is formed, and a saving from loss by the waste or scattering is effected.

My invention consists in the construction and arrangement of the elevating and gavel-forming mechanism of a harvester, and in the  
25 matter of effecting the separation of the grain for the different sheaves, as will be hereinafter more fully set forth.

In the drawings, Figure 1 is a side view. Fig. 2 is a back view. Fig. 3 is a front view, with horizontal apron in section. Fig. 4 is a sectional view on line *x x* of Fig. 2.

35 Q represents the frame. It has extension R, for supporting the cutting mechanism, and is composed of two horizontal beams, *q*, with other beams and braces, *q'* to *q<sup>12</sup>*, horizontal, oblique, upright, and cross.

40 A represents a horizontal endless receiving-apron running upon the rollers *a a*, the journals of which revolve in bearings on the beams *q*. It is located behind the cutter-bar and receives the grain as it is cut thereby.

45 B represents an inclined endless elevating-apron running upon rollers *b b*, journaled in bearings on the oblique beams *q'*.

C represents an elevating device, which is operated, in connection with the apron B, to  
50 elevate and deliver the grain to form the gavel.

It is composed of endless belts C C at each side, connected by cross-pieces C' C', which are provided with suitable teeth or prongs. The belts C C run on enlargements of rollers C<sup>2</sup> at the top and bottom. The lower roller, 55 C<sup>2</sup>, is journaled in bars C<sup>3</sup>, which turn freely on the axle of the upper roller, C<sup>2</sup>, which is joined in bearings.

D represents a frame composed of wires *d*, which serve to keep the grain in contact with 60 the apron B, the proper pressure being maintained by a spring, E, the tension of which is adjusted by set-screws *e*. The wires *d* are connected to a cross-bar, *d'*, at the top, but the side wires are also extended beyond and 65 passed through the cross-beam *q''*, to which the spring E is secured, and also through holes in the spring E until the shoulders *d<sup>2</sup>* thereon come in contact therewith.

At the bottom the wires are connected to a 70 cross-bar, *d<sup>3</sup>*, which is connected, by a link, *d<sup>4</sup>*, with arms *d<sup>5</sup>*, attached to a rock-shaft journaled in upright *q<sup>2</sup>*, and having an operating-lever, *d<sup>7</sup>*. This lever may be controlled by the 75 driver by hand or otherwise. By its operation the wire frame D and also the elevating device are lifted at the bottom from the apron B, or brought near thereto.

F represents a cut-off with one or more prongs, *f*. When elevated it allows the grain 80 to pass beneath; when let down it stops the passage of the grain. It is supported in bearings on the upright *q<sup>2</sup>* and *q<sup>3</sup>* on one side of the frame, and operated by an arm, *f'*, in connection with cams. 85

G represents a traction-wheel, from which motion is given, through bevel-gears *g* and *g'* and axle *g<sup>3</sup>*, to cam-wheels H I. It travels on the ground and supports the grain elevating and binding devices. The shaft *g<sup>5</sup>* revolves in 90 bearings or on cross-beams *g<sup>8</sup>* and *g<sup>9</sup>*.

The wheel H has on the outside two cams or projections, *h<sup>2</sup>* and *h<sup>3</sup>*, the latter extending beyond the former, and on the inside cams *h'* and *h<sup>4</sup>*, extending around about two-thirds of 95 the circumference. The cam *h<sup>4</sup>* operates the cut-off F through the arm *f'*. The wheel I has a cam or projection, *i*, on its outer face.

K represents a pulley on the end of the axle or shaft *g<sup>2</sup>*, and from it power is commu- 100



licated, through endless belt  $k$  and pulley  $K^b$ , to the roller  $b$ , to move the apron B, and through pinions  $K^c$  to the roller  $C^2$ , to move the elevator C.

5 The axles  $g^2$  and  $g^3$  have their bearings on the beams  $q$ . Upon the same axle  $g^2$  a second pulley is secured inside of the pulley K. On this pulley and on the pulley  $K^a$  runs an endless belt,  $k'$ .

10 L represents a belt-tightener. It is pivoted at  $l'$ , and has a roller,  $l$ , to run on the belt  $k'$ . The belt-tightener is raised by the action of the cam  $h$  of cam-wheel H upon the arm  $l^3$ , and then the belt  $k'$  runs loose and the apron  
15 A stops, when the arm  $l^3$  presses the roller against the belt, tightening it and starting the apron A. The tightener L is curved, as shown, to span the pulleys on shaft  $g^2$ .

M represents the binders' table, extending  
20 upward at the back. It is slotted at  $m$  and  $m'$ , and also on the edge at  $m^2$ .

N represents the gavel-compressor or compressing-arm. It is rotated forward and back through the slots  $m$  and  $m^2$  in the binders' table by means of the pinion  $n'$  on the shaft  $n$ ,  
25 which is journaled in bearings on the frame, and to which the compressor is secured.

O is a wheel having teeth cut on a portion of its circumference, which gear with the pinion  $n'$ . It is supported by a short shaft resting in a bearing on one of the uprights,  $q^7$ . It is partially rotated back and forth by levers  
30  $o$   $o'$ , pivoted at  $o^2$  and  $o^3$ , and connected by links  $o^4$  and  $o^5$  to arms  $o^6$  and  $o^7$ , rigidly secured to the wheel O.

The lever  $o$  is operated by the cam  $h^2$  to throw the compressor N forward to form and compress the gavel, and the cam  $h^3$  operates the lever  $o'$  to return it to its position behind  
40 the table.

P represents a wire grain-receiver. It is formed of bent wires, which project through the slots  $m$  and  $m'$ . They are secured at the back to a rock-shaft,  $p'$ , having an arm,  $p^2$ , at  
45 the outer end. This arm is connected by a link,  $p^3$ , with the lever  $p^4$ , pivoted at  $p^5$ , and operated by the cam  $i$  or cam-wheel I.

The cams on the wheels H and I are relatively arranged so that the wire receiver P is  
50 lifted as the compressor N returns.

The drop F and the belt-tightener L are operated simultaneously, or with the drop a little in advance.

In operation, the grain, as it falls from the  
55 cutters upon the apron A, is carried forward thereby, and is carried upward by the apron B and the prongs or teeth of the elevating device C, which project between the wires  $d$  and support the grain as it rises. It is then  
60 delivered to the binders' table M until the compressor N is operated and the gavel formed. The belt-tightener L is lifted as the cam  $h'$  is brought into contact with the arm  $l^3$ , the belt  $k'$  runs loose, and the apron A stops. The  
65 prong  $f$  of the cut-off F also falls, and the supply of grain to the elevator ceases. This

happens before the movement of the compressor begins to allow any grain on the elevator to be delivered. Any grain delivered thereafter is held by the wire receiver P, which is lifted by  
70 the action of the cam  $i$  on the wheel I through the connecting mechanism above described, so as to remove the grain from behind the compressing-arm and allow it to return to its former position more easily.

75 The gavel formed may be bound by hand or a suitable self-binder.

As the cam-wheels revolve the belt-tightener is released and the prong  $f$  lifted, and grain is again delivered to the elevator by the  
80 apron A.

When the compressing-arm N has returned to its position behind the table the wire receiver drops to its first position on the table.

By the intermittent motion of the apron A  
85 the grain for one sheaf is separated from that which is to form the next one, and this separation takes place at the angle formed by the aprons A and B, and is rendered more complete by the drop F, as it serves to hold the  
90 grain on the apron till the separation is made by the removal of the grain from the angle by the elevator. This separation is effected automatically. As a considerable bundle collects in the angle, to enable it to be properly lifted  
95 by the elevator the wire frame D is moved outward by the handle  $d^7$ , so as to give sufficient room between the wires and the apron B. The proper pressure of the wires against the grain is secured by the spring E.

100 Instead of using the belt-tightener to start or stop the apron A, this result may be accomplished by shifting the belt from a loose to a fast pulley, or vice versa, or by means of a clutch in connection with a loose pulley, the  
105 operation being effected by cams in substantially the same manner as the belt-tightener is operated. The belt-tightener or its equivalent may be operated by the driver.

110 Instead of using a single-leaf spring, E, spiral springs might be employed, or several springs.

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

115 1. The combination, with the elevator of a harvester, of an intermittently-moving receiving-apron, as specified.

2. The combination, in a harvester, of the elevator and receiving-apron with a drop having one or more prongs, and adapted to be raised and lowered, substantially as described.

3. The combination, in a harvester, of the receiving-apron with mechanism, substantially as described, adapted to automatically stop  
125 and start said apron, as set forth.

4. The binders' table M, extended upwardly at the back and provided with slots  $m$   $m^2$ , in combination with the compressor N, arranged to operate in connection therewith to form the  
130 gavel, substantially as described.

5. In combination with the gavel-forming



mechanism of a harvester, a wire grain-receiver projecting through the slotted binders' table, arranged as described, to lift any grain that may have fallen thereon out of the way of the returning compressor, substantially as set forth.

6. In a harvester, the combination of devices for receiving the cut grain and continuously-operating devices for elevating the same with devices for retaining or holding the grain on the receiver while a separation of the grain

to form the different gavels or sheaves is effected by the elevator, substantially as described.

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

ALBERT S. HOYT.

Witnesses:

H. S. ABBOT,  
A. M. LONG.