

(No Model.)

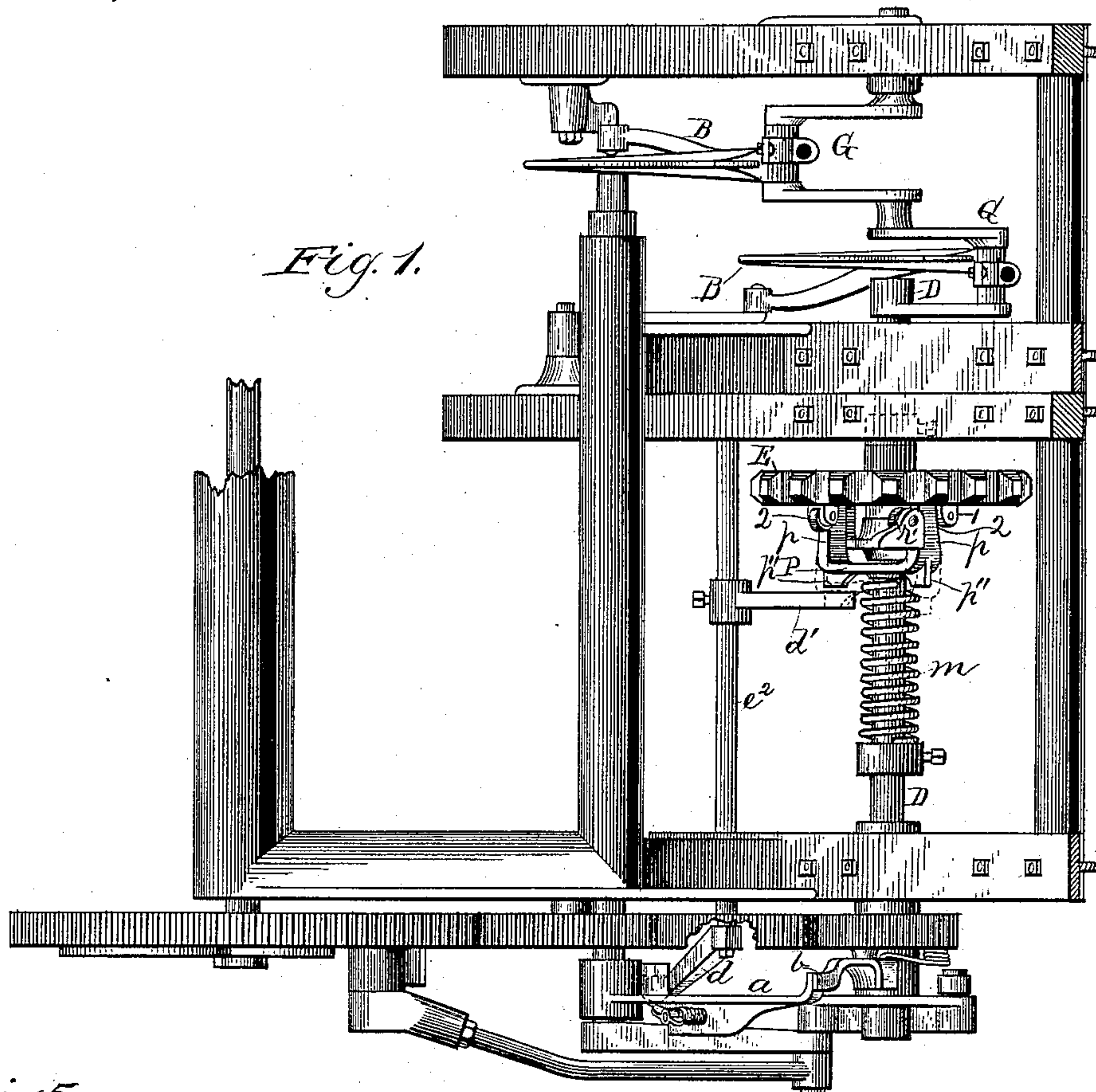
3 Sheets—Sheet 1.

J. F. APPLEBY.

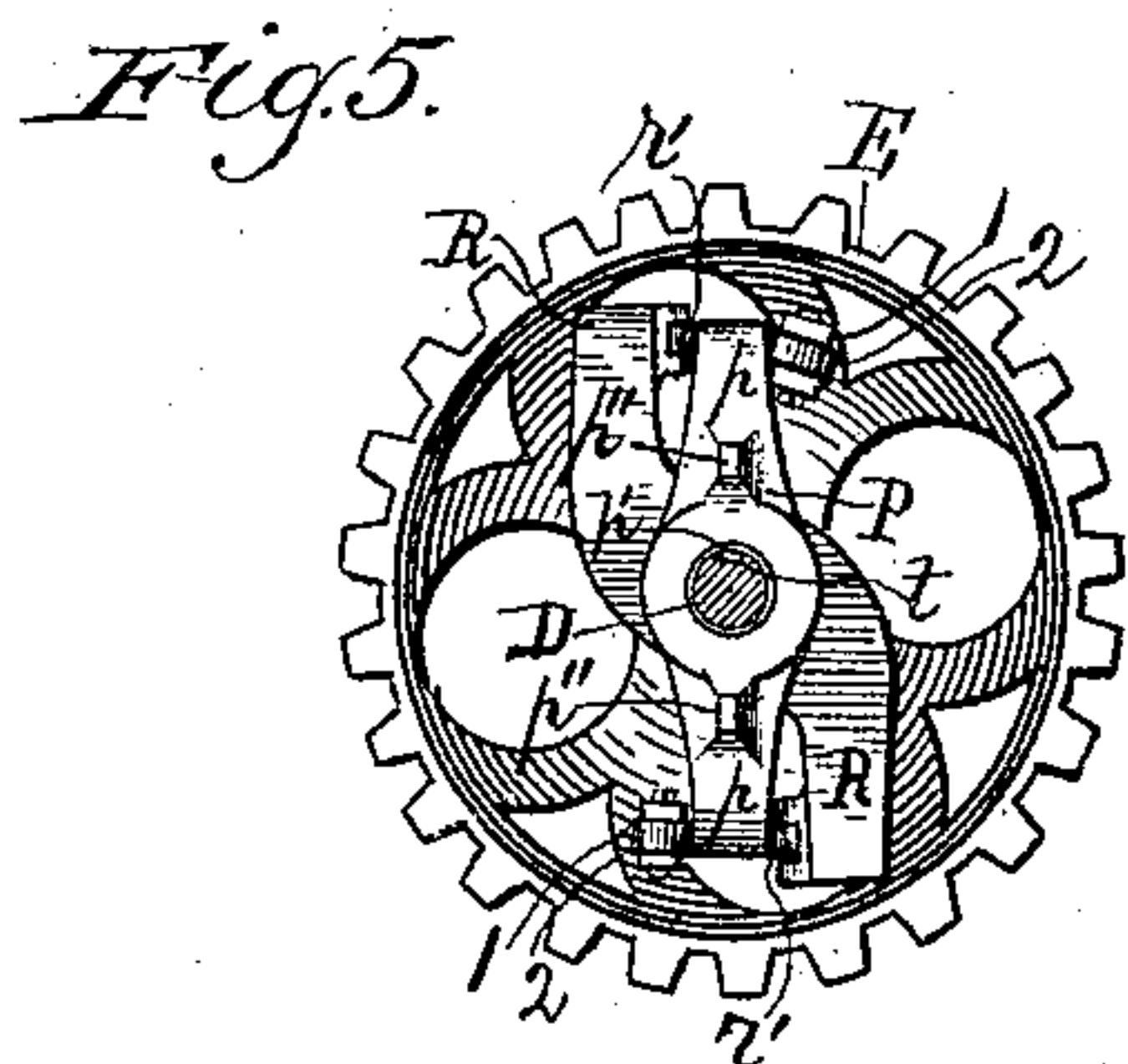
# GRAIN BINDER.

No. 332,986.

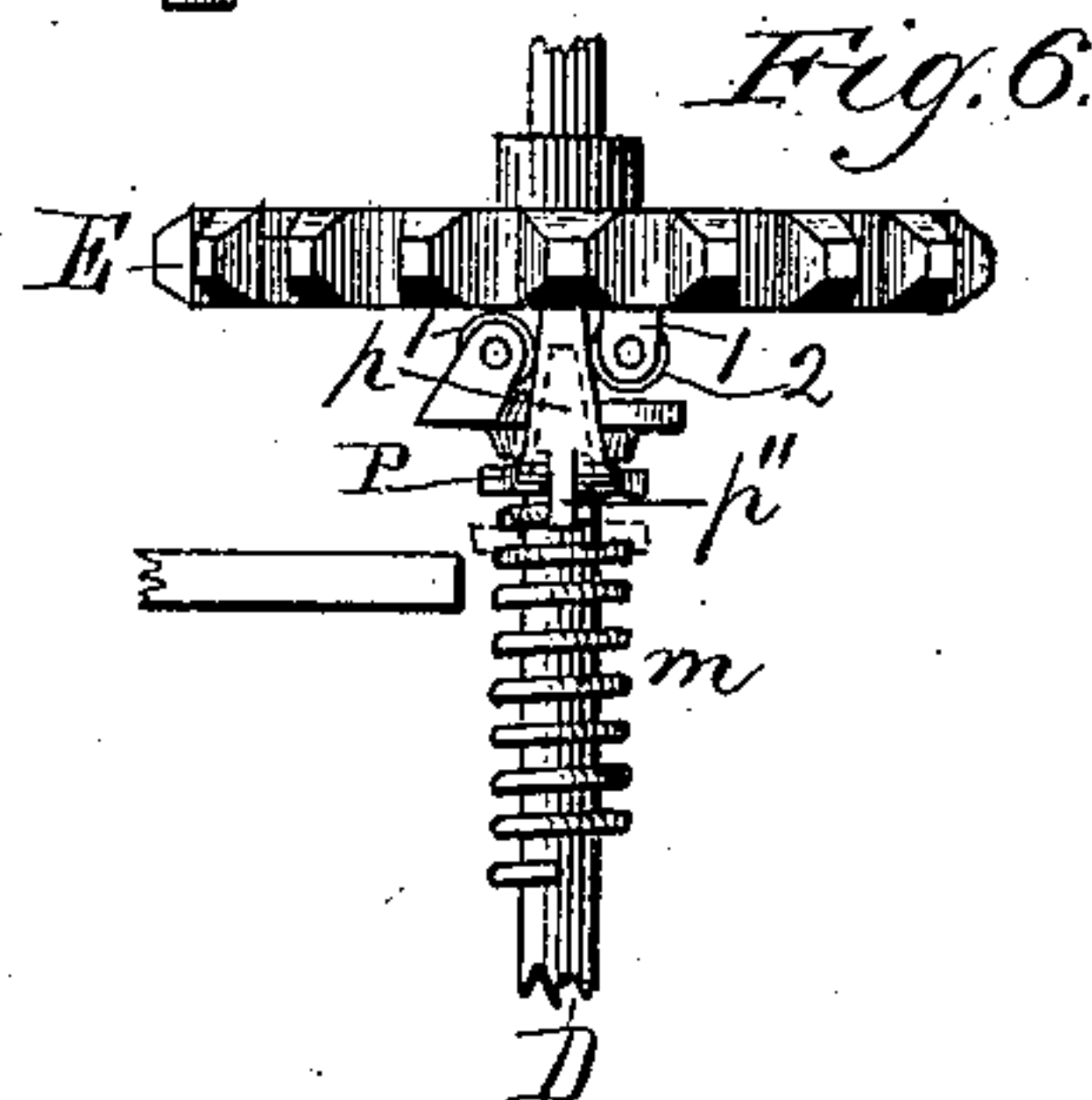
Patented Dec. 22, 1885.



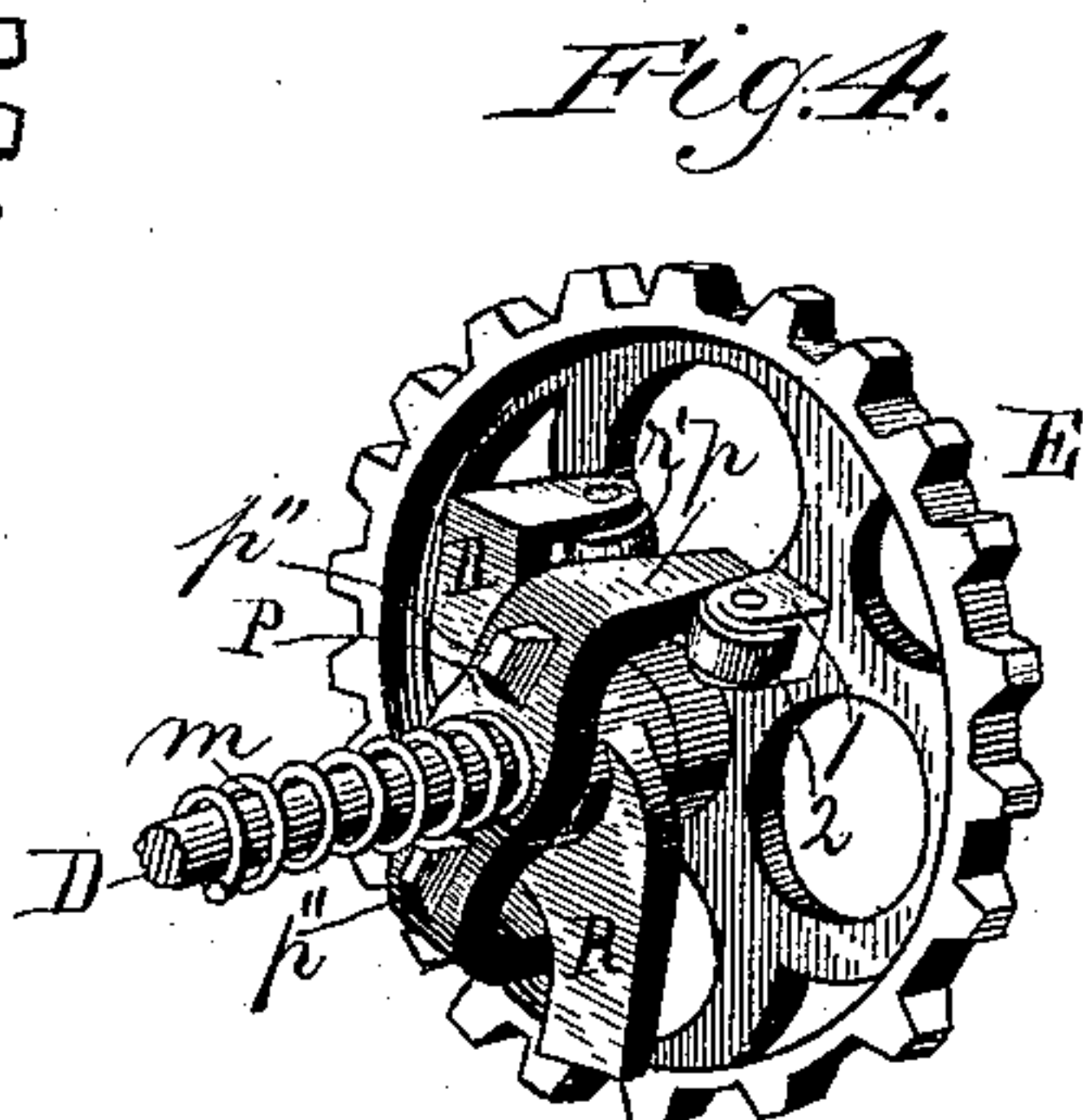
*Fig. 1.*



*Fig. 5.*



*Fig. 6.*



*Fig. 4.*

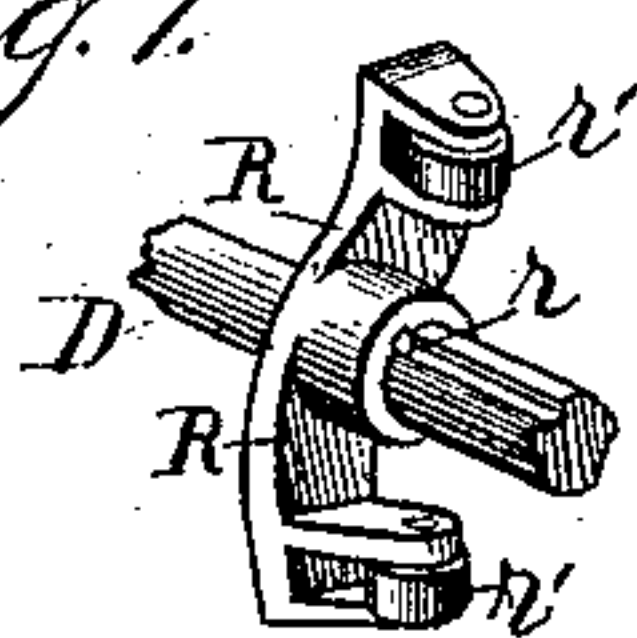


Fig. 7.

*Witnesses.*

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(No Model.)

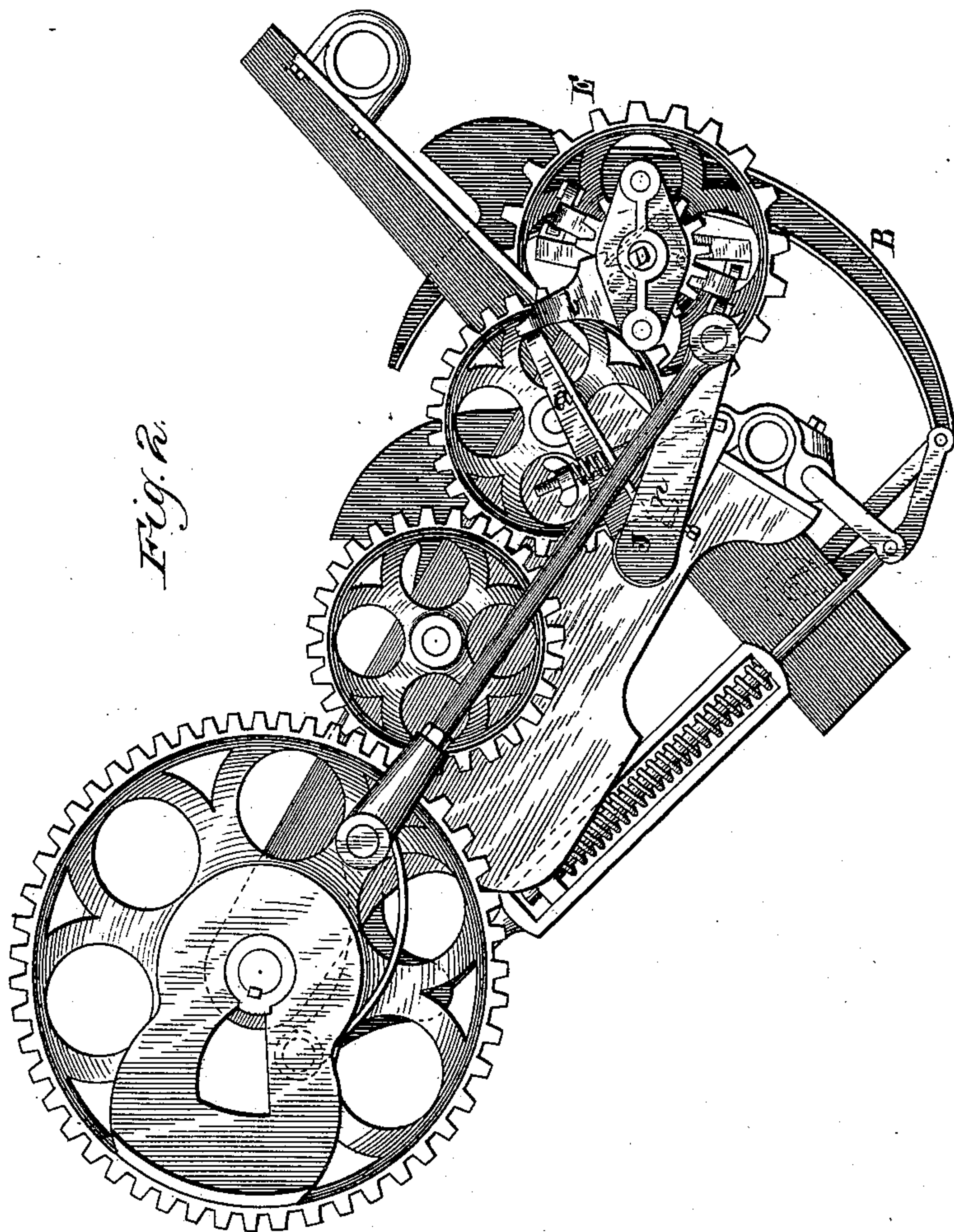
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GRAIN BINDER.

No. 332,986.

Patented Dec. 22, 1885.



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(No Model.)

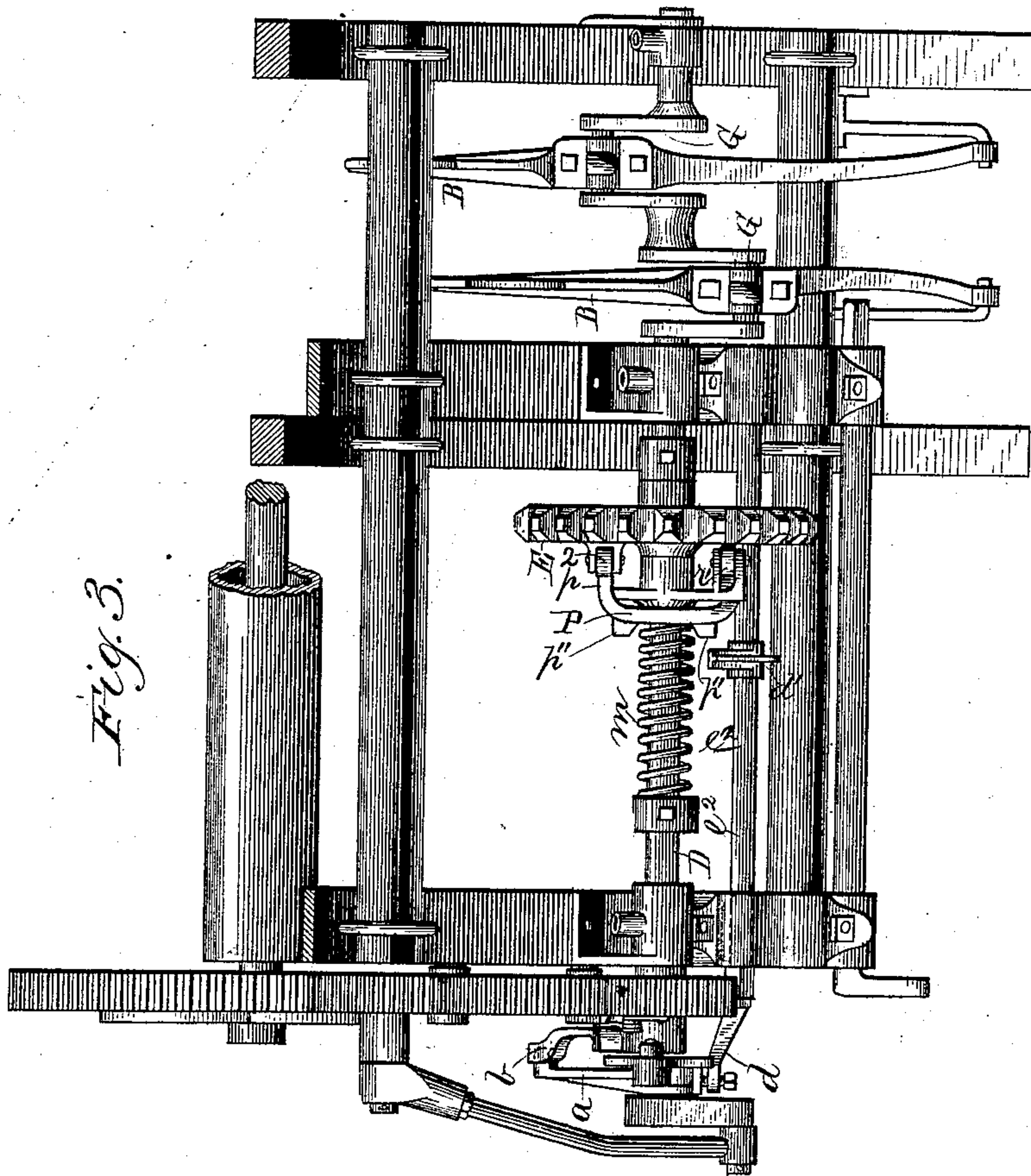
3 Sheets—Sheet 3.

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# GRAIN BINDER.

No. 332,986.

Patented Dec. 22, 1885.



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# UNITED STATES PATENT OFFICE.

JOHN F. APPLEBY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE  
MINNEAPOLIS HARVESTER WORKS, OF SAME PLACE.

## GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 332,986, dated December 22, 1885.

Application filed October 28, 1884. Serial No. 146,652. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. APPLEBY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Grain-Binders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My present invention relates to improvements in that type of self-binders in which the tripping devices or means employed to throw the binder-driving mechanism into action on the sheaf binding and discharging mechanisms are operated from the packer-arms or other devices which press the grain down into the gavel-collecting receptacle.

My invention has for its object to render the trip mechanism, which is actuated by the packer-arms, so sensitive at the given time to the resistance of the grain to the packer-arms, and so prompt in its movements as to make the tripper certain in its action, whereby wet or tangled grain or other causes are not liable to operate it too soon, and thus produce sheaves of too small size, and whereby other causes will not prevent its prompt action at the proper time, and thus produce too large sheaves, and bring unnecessary strain on the binding devices.

One type of binders to which my invention relates is shown in United States Letters Patent No. 264,602, issued to me September 18, 1882, and I have chosen parts of the binder shown and described in said Letters Patent for the purpose of illustrating my present invention, and said patent may be referred to for a fuller description of such parts as are shown and their operations fully described therein, and hence need not be further herein described than will be necessary to a ready comprehension of the nature and operation of my improvements in connection therewith.

In my former patent hereinbefore referred to the sliding yoke which slides on the drive-shaft of the binder mechanism is forced away

from the drive-wheel altogether by the action of the projections from said wheel on inclined cam-faces on the sliding yoke; and my present invention consists in the use of arms fixed to the drive-shaft, and provided preferably with anti-friction rollers, and located or arranged so that the sliding yoke formed with wedge-shaped ends for the purpose will slide between the projections from the drive-wheel and said arms, and thereby yield with greater promptness and certainty to the resistance offered the packer-arms by the gavel when it (the gavel) has become of the size required and given by the adjustment of the binder mechanism in the well-known manner.

My invention further consists in improvements in the means used for transmitting motion from the sliding sleeve on the drive-shaft to the rock-shaft, which is designated by the reference-letter *e*<sup>2</sup> in my aforesaid patent, all as hereinafter described.

In the accompanying drawings, Figure 1 is a top plan of my invention and adjacent parts of a grain-binder. Fig. 2 is a front end elevation. Fig. 3 is a side elevation. Fig. 4 is a perspective showing the sprocket drive-wheel and the clutching mechanism. Fig. 5 is an elevation of parts shown at Fig. 4. Fig. 6 is a top plan of my improvement, showing the parts in different relative positions from that shown at Fig. 5. Fig. 7 is a perspective of the sliding yoke.

In the several figures of the drawings, and in order that the drawings may be fully understood, the same reference-letters are used to designate the same parts as in my patent No. 264,602, except the parts of my present invention, which are designated by reference-letters not used in said patent, and in which the same reference-letter designates the same part in all the figures where used.

D is the main driving-shaft of the binder mechanism, and is continuously rotated while the machine is in operation by a chain passed around the sprocket-wheel E and around a driving sprocket-wheel mounted on a main shaft (not shown) of the harvester. The sprocket-wheel E is loosely mounted on the shaft D, and is connected with said shaft D so as to rotate it, as hereinafter described. The shaft D is provided with cranks G G, which



operate the packers B B in the ordinary manner. The shaft D, with its cranks G and wheel E, is operated as shown and described in my aforesaid patent, as is also the trip lever or arm *a*, which has to be slightly lifted at its upper or free end in order to liberate the spring-dog *b*, that rests on the said end of said lever *a*, for the purpose of clutching the drive-pinion of shaft D, which is normally loose on the shaft that operates the devices for binding and tying and discharging the sheaf.

P is a yoke, mounted on the shaft D and made to rotate therewith, while it can slide lengthwise of said shaft by means of a feather, *p'*, which projects from the hub of the yoke into a groove, *t*, in the shaft D. The arms of the yoke P extend radially from the shaft D, and their ends *p* are bent and are parallel or about parallel with the axis of said shaft, and are tapering or wedge-shaped, as shown. Lugs *p'' p''* project one from each radial arm of the clutch P, being one at each side of the shaft D. The yoke P is pressed or forced toward the wheel E by a strong spiral spring, *m*, which encircles the shaft D, and the yoke is forced in the opposite direction by the mechanism now to be described.

From the face of the wheel E which is toward the yoke P project two studs, 1, located at diametrically opposite points on said wheel, and each provided at its outer end with axial bearings for an anti-friction roller, 2.

R R are arms projecting from the shaft D between the wheel E and the radial arm of yoke P. I have shown the arms R as connected and fixed rigidly to the shaft D by means of a feather, *r*, and groove, as seen at Fig. 7; but they may be rigidly connected with said shaft in any desired manner. The end of each arm R is bent toward the wheel E and provided with an axial bearing for an anti-friction roller, *r'*. The anti-friction rollers *r'* are in or about in the same circumferential plane with reference to the shaft D as are the similar rollers 2.

While the yoke P is in its normal position or pressed toward the wheel E by the spring *m* its wedge-shaped ends *p* rest one between each of the rollers 2 and *r'*, and the other between the other rollers 2 and *r'*, as shown most plainly at Figs. 5 and 6.

In describing the operation of my present invention it is not deemed necessary to describe the operation of the packers or other parts of the binder.

The continuous rotation of the wheel E will continuously rotate the shaft D by means of the rollers 2, acting on the wedge-shaped ends *p* of the yoke P, and when the grain in the grain-receptacle has increased to the given quantity necessary to offer a given resistance to the forward movement of the points of the packers it will tend to retard the shaft and also the yoke P revolving therewith, and thereby cause the roller 2 to force the wedge-shaped ends *p* of the yoke P with increased force against the roller *r'*, and thus cause the

yoke P to yield lengthwise of the shaft, as shown by dotted lines at Fig. 1, and thereby bring one or the other of the lugs *p''* in contact with the arm *d'*, which is rigidly connected with and projects radially from the rock-shaft *e*<sup>2</sup>, and by its action on said arm partially rotate said shaft *e*<sup>2</sup>, and thereby operate the trip-lever *a* and the devices for binding, tying, and discharging the sheaf, as shown and described in my patent hereinbefore referred to. As soon as the sheaf is discharged the resistance to the packers ceases, and the spring *m* will force the yoke P back toward the wheel to the position shown by full lines in the drawings. There being no connection between the yoke P and the arm *d'*, and the yoke being geared with the wheel E, as it is, will move out of contact with the arm *d'* promptly when the resistance of the grain to the packers ceases, and the yoke will move into contact with said arm when the proper resistance of the grain to the packers is reached, promptly, and thus form sheaves of uniform size, and resist strains and interference with regularity of binding by wet or tangled grain and from other causes.

All subject-matter shown in the drawings and described in this specification not pertaining to the particular tripping device herein claimed is hereby disclaimed in this application.

It will be readily seen that one arm of the yoke P may be dispensed with, and also the adjacent arm R, and the adjacent stud 1 and its roller 2; but I prefer to use the device with all of these parts, as shown and described; and I do not limit my claims to the use of the two-armed yoke; but

What I claim herein as new, and desire to secure by Letters Patent, is—

1. In a grain-binder of that type in which the resistance of the grain in the gavel-receptacle to the packer or packers causes said packer or packers to operate a trip mechanism for throwing the binding, tying, and sheaf discharging mechanism into operation, in combination with a loose sprocket-wheel, E, the constantly-revolving shaft D, and the packers, a sliding yoke, P, on shaft D provided with wedge-shaped ends arranged to stand between projections from the wheel E and arms fixed to the shaft D and provided with lugs *p''*, an arm projecting from the shaft *e*<sup>2</sup>, and a spring adapted to force said yoke away from the arm on the shaft *e*<sup>2</sup>, substantially as and for the purpose specified.

2. In a grain-binder of the type herein described, in combination, the shaft D, carrying the packers, a wheel, E, having lugs 1, arms R, fixed to the shaft D, and a sliding yoke, P, provided with wedge-shaped ends adapted to coact with the lugs 1 and arms R, and lugs *p''*, adapted to coact with the arm *d'* on the shaft *e*<sup>2</sup>, and a spring, *m*, substantially as and for the purpose specified.

3. In a grain-binder of the type herein specified, in combination with the sprocket-wheel, E, loosely mounted on the shaft D, and



the arms R, fixed to the shaft D, a sliding yoke, P, having tapering or wedge-shaped arms adapted to coact with the wheel E and fixed arms R, substantially as and for the purpose specified.

4. In a grain - binder of the type herein specified, in combination, the shaft D, carrying the packers, wheel E, having projections 1, and sliding yoke P, adapted to coact with a projection from the shaft  $e^2$ , substantially as and for the purpose specified.

5. In a grain - binder of the type herein specified, the combination of the shaft D, packers G, and a sprocket-wheel, E, loosely mounted on the shaft D, and adapted to act on one side of the wedge-shaped arms  $p$  of the yoke P, and press their other sides against projections from the shaft D, whereby the yoke will be forced away from the wheel to cause it to engage with a projection from the shaft  $e^2$ , substantially as and for the purpose specified.

6. In a grain - binder of the type herein specified, the combination, with the packing arm or arms and the trip-lever, of an intermediate mechanism for causing the said arm or arms to actuate the said lever, composed, essentially, of a drive-wheel mounted loosely on the drive-shaft of said packing arm or arms, a sliding yoke mounted to slide on said shaft and held in close relation with the said wheel by a spring and provided with wedge-shaped or tapering arms adapted to coact with said wheel, and arms projecting from said drive-shaft and provided also with projections adapted when the yoke is shifted to communicate motion to the trip-lever, substantially as and for the purpose specified.

JOHN F. APPLEBY.

Witnesses:

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