

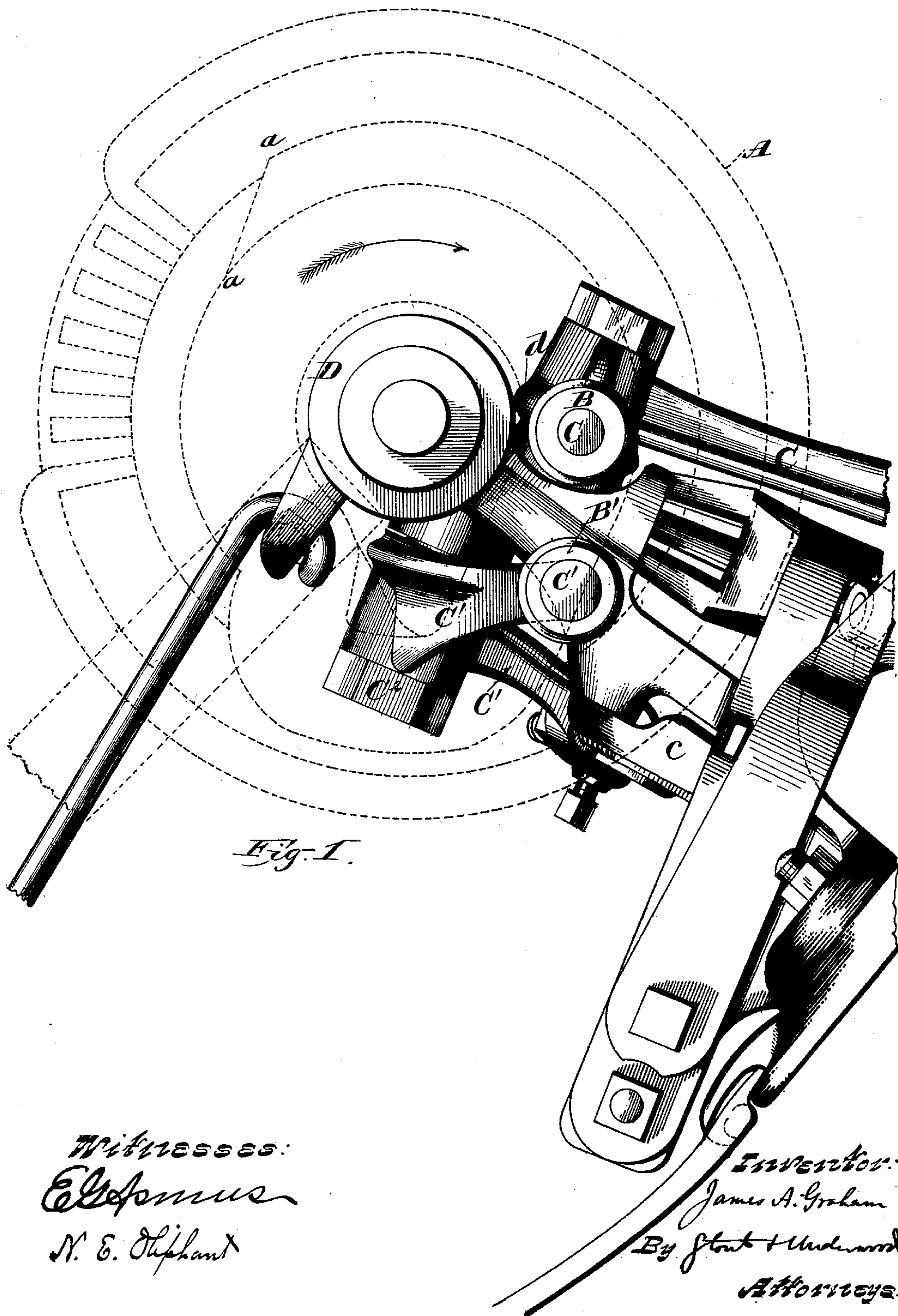
(No Model.)

3 Sheets—Sheet 1.

J. A. GRAHAM.
GRAIN BINDER.

No. 407,069.

Patented July 16, 1889.



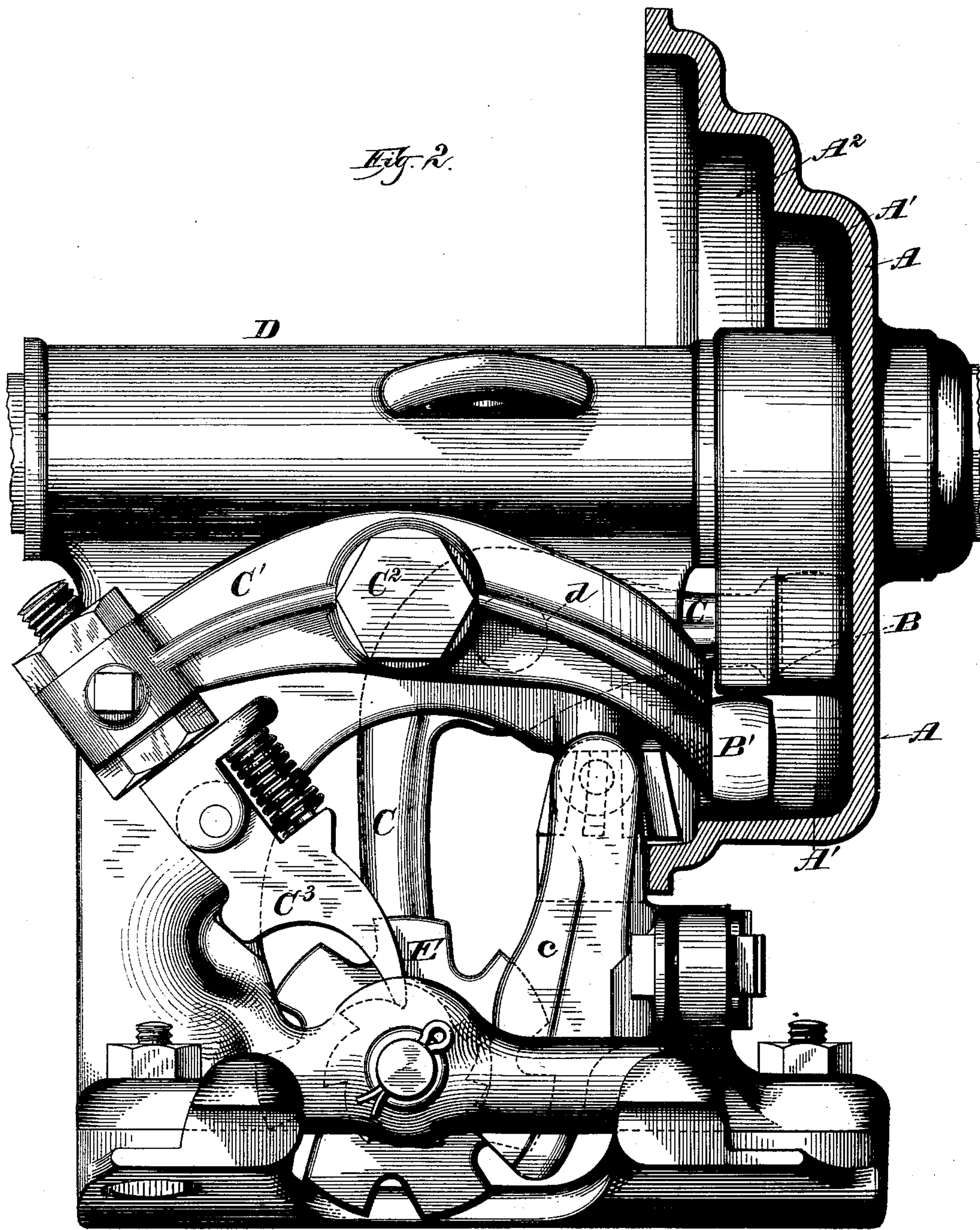
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3 Sheets—Sheet 2.

J. A. GRAHAM.
GRAIN BINDER.

No. 407,069.

Patented July 16, 1889.



Witnesses:

E. G. Jones
N. E. Oliphant

Inventor:

James A. Graham
By *Stout & Underwood*
Attorneys.

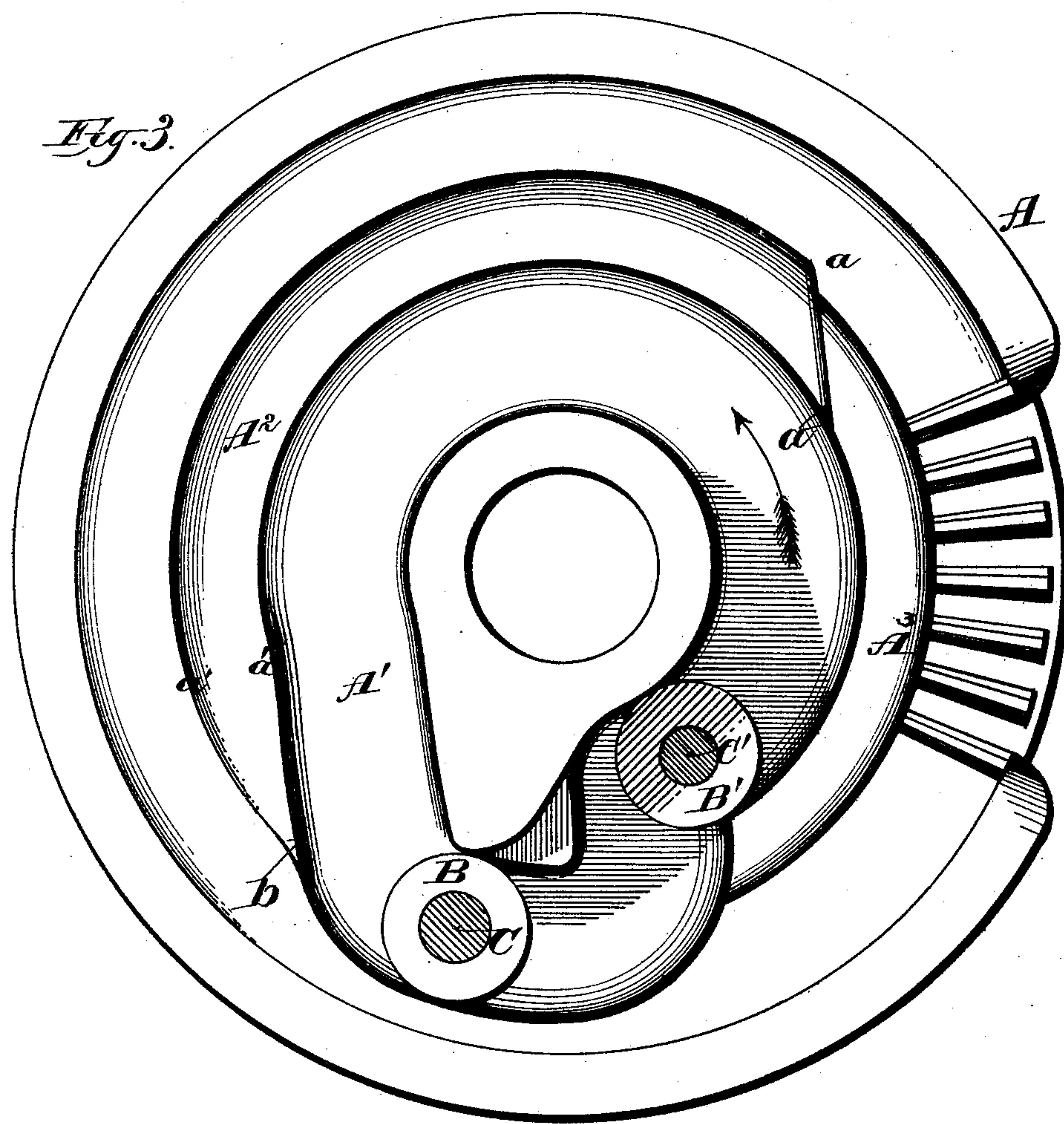
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3 Sheets—Sheet 3.

J. A. GRAHAM.
GRAIN BINDER.

No. 407,069.

Patented July 16, 1889.



Witnesses:

E. J. Somers
N. E. Oliphant

Inventor:

James A. Graham
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Attorneys.

UNITED STATES PATENT OFFICE.

JAMES A. GRAHAM, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE MILWAUKEE HARVESTER COMPANY, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 407,069, dated July 16, 1889.

Application filed January 17, 1887. Serial No. 224,541. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. GRAHAM, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, 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.

My invention relates to the tying mechanism for grain-binders, and is designed as an improvement on the device described and claimed in Letters Patent No. 322,770, granted to Chas. M. Young, July 21, 1885, and will be fully described hereinafter.

In the drawings, Figure 1 is a front end elevation of the knotter-head of a grain-binder embodying my invention, the knotter cam-wheel being shown in dotted lines. Fig. 2 is an elevation of the knotter-head from below, the knotter cam-wheel being shown in cross-section; and Fig. 3 is a view of the knotter cam-wheel with the operating anti-friction rollers in place.

A is the knotter cam-wheel, which is formed of unusual depth, so as to have formed therein two eccentric cam-tracks A' and A², the former extending farther into the wheel than the other, and which are for a certain portion of their length (from the points *a a* to the points *a' a'*) concentric to each other, while from the points *a' a'* to the point *b* the two tracks are side by side, but not concentric, the shallow track A² extending from the points *a a* to the point *b*, and being for the reception of the anti-friction roller B' during a portion of the revolution of the wheel, while the deep track A' receives both of said anti-friction rollers. That part of the wheel marked A³ (shown in Fig. 3 between the position of the roller B' and the points *a a* and between the track A' and the segment-rack) is non-operative, and this part is merely cut away somewhat from the general plane to reduce the weight and cost of metal of said wheel.

The roller B is on one end of the knife-arm C, and roller B' is on a like end of the disk-lever C', the latter projecting only a short distance into the groove A', while the knife-arm C extends to the full depth of groove A', as shown in Fig. 2.

The knife-arm C is of bell-crank shape, and is pivoted to the frame D between its elbow and roller end, as shown in dotted circle at *d*, Fig. 2, and its long arm carries the knife. (Not shown, but which is similar to that in Young's patent above referred to.)

The disk-lever C' is for the greater portion of its length substantially crescent-shaped, as shown in Fig. 2, having at one end a bearing for the anti-friction roller B', pivoted thereto, and at the other end a bearing for the shank of the disk-pawl C³, secured thereto, the crescent-shaped portion being between these two ends, and the said disk-lever being pivoted to the frame at C² about midway between said two ends.

E is the holding-disk, and *c* is the finger that acts with the disk E to hold the cord. This latter finger *c* differs from those that have hitherto come under my knowledge, in that it is cast of a single piece of malleable iron.

My improved knotter-head does not differ materially from the Young knotter in operation; but my invention is designed to simplify the Young knotter-head, in that I greatly reduce the size of cam-wheel, as one groove serves for both of the anti-friction rollers B and B', for the track A' and track A² constitute practically a single groove with two tracks, and take up very much less room than two separate grooves and admit of a much cheaper and smaller casting.

In operation the track A² carries the roller B' when the knife-arm is idle, and the disk-lever and knife-arm are caused to oscillate at the proper times by the action of the cams in the track A'.

It will be noticed that I wholly dispense with the curved and hooked flanges for guiding the end of the disk-lever shown in the Young patent by changing the shape of the disk-lever to a substantially crescent form in a horizontal plane and pivoting it midway between the roller B' and the shank of the disk-pawl C³, thereby greatly simplifying the construction of the knotter-head.

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

1. In a knotter-head for grain-binders, the combination, with the knife-arm and disk-lever, each having an anti-friction roller at its end, of a wheel of unusual depth having formed therein two eccentric cam-tracks, one extending farther into the wheel than the other, the said tracks being for a certain portion of their length concentric to each other and for a certain portion side by side, but non-concentric, substantially as set forth.

2. In a knotter-head for grain-binders, the combination, with the knife-arm C, carrying the anti-friction roller B at one end, and the disk-lever C', carrying the anti-friction roller B' at its corresponding end, of the cam-wheel A, of unusual depth, having formed therein two eccentric cam-tracks A' A², the former being of greater length, depth, and width than the latter, said tracks being for a certain portion of their length concentric to each other and for a certain portion side by side, but non-concentric, substantially as set forth.

3. In a knotter-head for grain-binders, the

combination, with a cam-wheel of unusual depth having formed therein two eccentric cam-tracks, one extending farther into the wheel than the other, the said tracks being for a certain portion of their length concentric to each other and for a certain distance side by side, but non-concentric, of a frame, the disk-lever C', of substantially crescent shape in a horizontal plane and pivoted midway between its ends to said frame, the anti-friction roller B', pivoted to one end of said disk-lever, and the disk-pawl C³, secured to the other end of said disk-lever, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

JAMES A. GRAHAM.

Witnesses:

S. S. STOUT,

G. H. SCHULTE.