

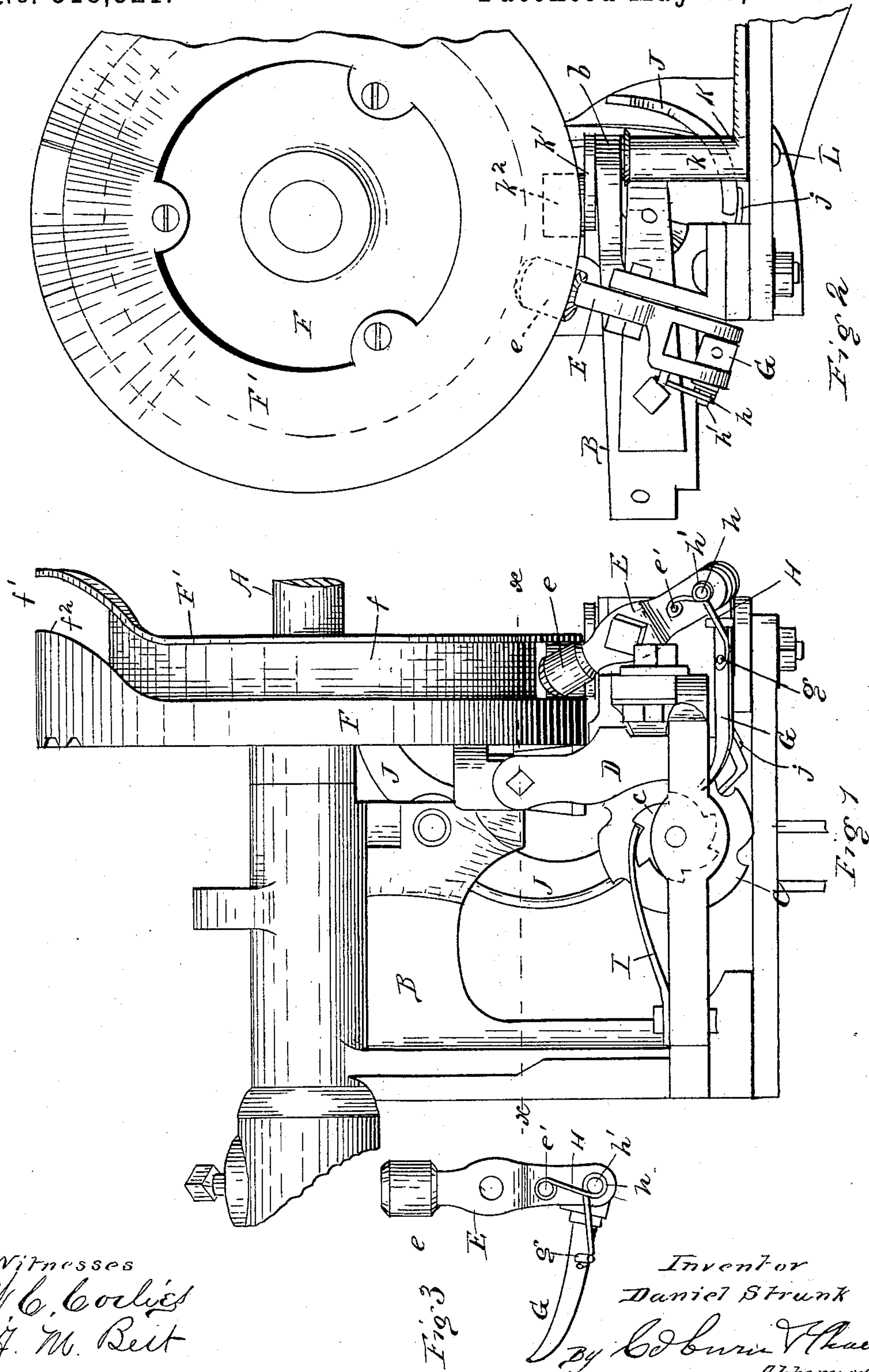
(No Model.)

2 Sheets—Sheet 1.

D. STRUNK.
GRAIN BINDER.

No. 318,321.

Patented May 19, 1885.



Witnesses
W. C. Corlies
A. M. Beil

Inventor
Daniel Strunk
By Edwin V. Thacker
Attorneys

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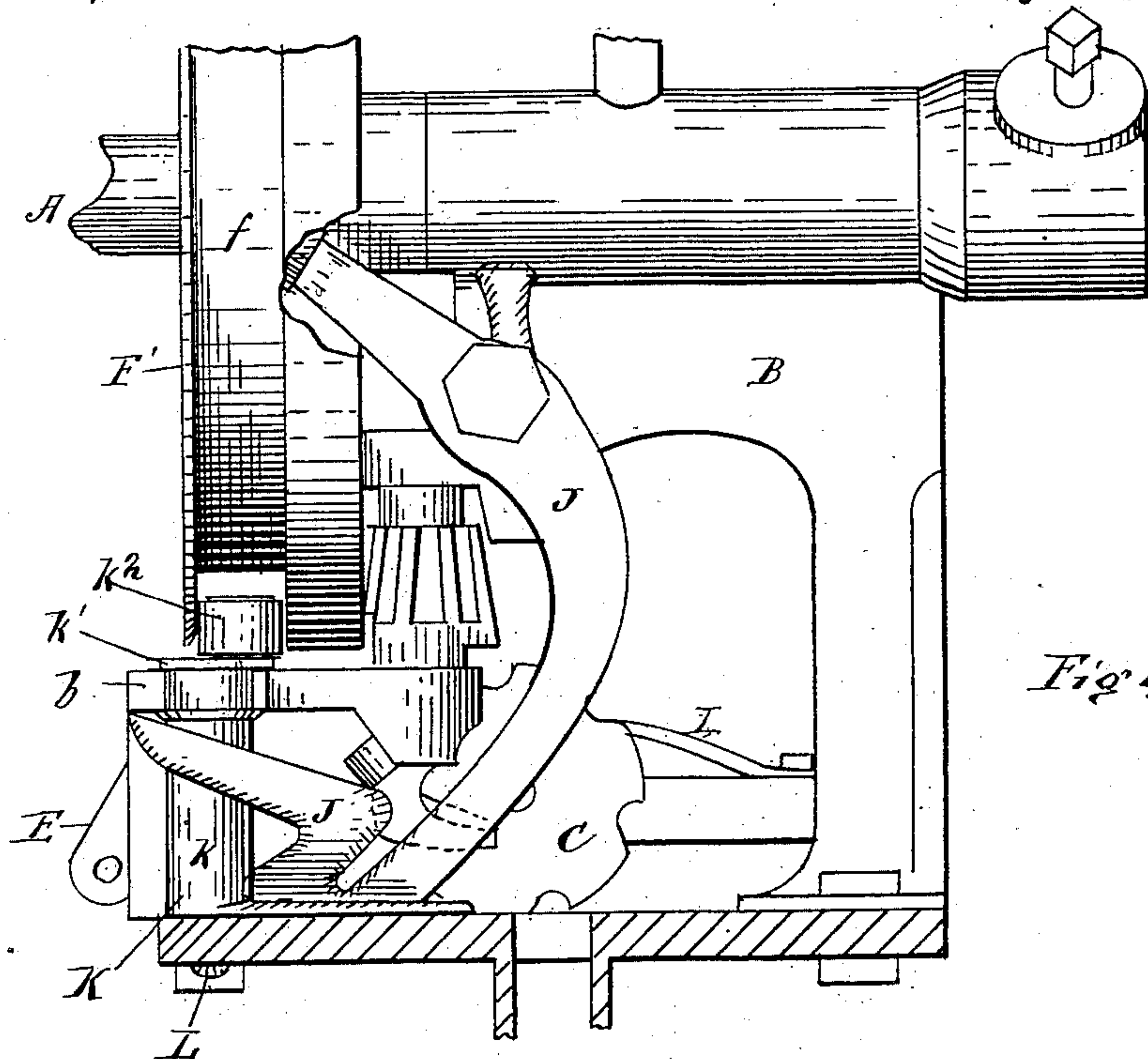


Fig 4

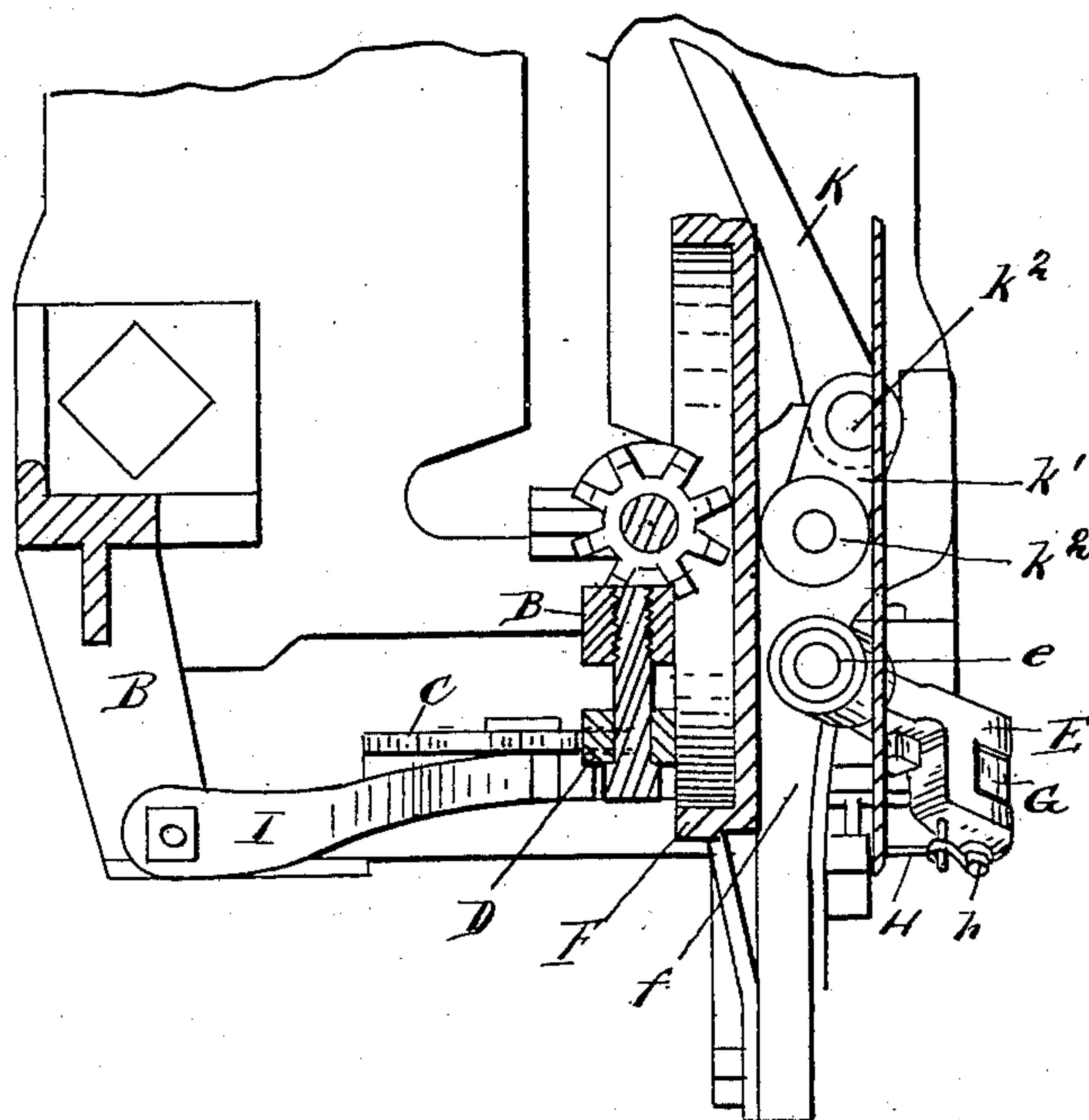


Fig 5

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UNITED STATES PATENT OFFICE.

DANIEL STRUNK, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF TWO-THIRDS
TO MINNEAPOLIS HARVESTER WORKS, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 318,321, dated May 19, 1885.

Application filed January 14, 1884. (No model.)

To all whom it may concern:

Be it known that I, DANIEL STRUNK, a citizen of the United States, and residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented a certain new and useful Improvement in Grain-Binders, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents an outer side view of a knotter-mechanism frame with a part of the main shaft and the knotter-operating wheel of a grain-binder having my improvement applied; Fig. 2, an end elevation of the same on the cam-wheel end of the mechanism, and Fig. 3 an elevation of the lever and dog detached which operate the cord-holder; Fig. 4, an inner side view of the mechanism shown in Fig. 1; and Fig. 5, a section of the same, taken on the line *x x*, Fig. 1.

My invention relates to that class of grain-binders in which twine or cord is used for the binding material, and the improvements which I have made are in the mechanism by which the cord-holder is operated, and means for operating the cord-tucker.

I will proceed to describe in detail one way in which I have embodied my invention in practical form, and will then point out definitely in the claims the special improvements which I believe to be new and wish to protect by Letters Patent.

I have shown in the drawings and shall describe only such parts of a grain-binder as are necessary to an understanding of the construction and operation of my present improvements, and this requires only a few of the main elements of the machine. It will be understood that in its general features of construction the machine may be of any ordinary type.

In the drawings, A represents the main shaft of the binder, and B a knotter-mechanism frame, which is mounted on the main shaft, an arrangement of this device which is common and well known. The knotting-hook and other parts usually located here are carried on this frame; but as they constitute no part of my present invention they are not fully shown, and I shall not describe them except as required for my present improvements. At the

back or outer side of the frame is a cord-holder, C, which is of the usual disk variety, the disk running at one edge in a grooved clamping piece or keeper, D, and being provided with a ratchet-wheel, *e*, either attached to it or to its shaft or made in one piece therewith, as shown in Fig. 1 of the drawings. These parts are common and well known in construction and operation, and require no further description here.

I have devised special means for giving the intermittent movement to the disk which is required to seize and clamp the cord at the proper time. A lever, E, is pivoted near the middle of its length to a suitable support on the outer side of the frame and at the lower corner thereof under the knotter-actuating wheel F, which is fastened to the main shaft of the binder, as usual. On the periphery of the wheel I provide a cam-groove, *f*, in which is arranged the upper end of the lever E, as shown in Fig. 1 of the drawings, this end being preferably provided with an anti-friction roller, *c*. The lever E is substantially straight, and to its outer end is pivoted a pawl or dog, G. The arrangement of the lever and pawl is such that if the latter is extended inward from its pivot horizontally it will be in position to engage at its free end with the ratchet of the cord-holding disk. A spring, H, is connected to the lever and the pawl in such a way as to hold the latter in working position, but at the same time permit it to yield. This is a well-known device, and may be of any construction and arrangement adapted to the purpose.

In the drawings I have shown the spring attached at one end to a pin, *e'*, on the lever, coiled at its central portion *h* around a second pin, *h'*, on the lever, and having its free end arranged to act against a pin, *g*, on the pawl to hold the latter up in working position. The groove *f* on the knotter-actuating wheel is straight nearly all the way round, and the lever while in this part of the groove is held in the position shown in full lines in Fig. 1 of the drawings, in which position the pawl is disengaged from the ratchet; but at one point of the groove there is a bend or turn, *f'*, outward, and obviously when the wheel turns around so as to bring this portion of

the groove into action on the pawl-lever the latter will be vibrated so as to throw the pawl inward, causing it to engage with the ratchet, the bend being formed so as to give a throw 5 to the lever and pawl which will move the ratchet one notch. This bend in the cam-groove is located so as to throw the lever and pawl at the time required to take the cord and clamp it in the usual operation of the machine, which need not be described here, as it 10 is well known and understood. The bend in the cam-groove is short, and runs back into the straight portion of the groove, so that the lever and pawl will be at once thrown back into the position first mentioned. 15

The machine is provided with the usual stripper, J, which is pivoted to the frame, and is bent at its lower end in the usual way to hold and guide the cord and strip the loop 20 from the knotting-hook. This device is so well known and is so familiar in its construction and operation that it does not require further description here. The upper end of the stripper is carried inward, and, as usual, enters a cam-groove in the inner side of the 25 wheel F, by which the stripper is vibrated in the usual way. This construction is also old and well known. A cutter, j, is also preferably attached to the stripper so as to be operated by the movement of the latter. 30

It will be noticed that the work of throwing the lever E in its operative direction is accomplished by the projection f^2 , extending outward from the inner face of the groove f . 35 I prefer the groove described above, by which the lever is moved positively in both directions and no spring is required; but some other means might be employed to throw the lever in one direction or to hold it up against the cam. This groove may be formed by mak- 40 ing the outside portion separately in the form of a circular or annular plate, F' , bent into the required form and then bolted to the wheel, as shown in Fig. 2 of the drawings. 45 In this case the opposite portion of the groove is obtained by providing a rim or flange on the outer face of the wheel of suitable form for the purpose. A flange of this general description is usually found on the wheels in 50 ordinary use, and my improvement can therefore be readily applied to machines in use, for to provide the cam-groove it will be necessary only to cut this flange to the required form and attach to the wheel the bent plate described 55 above. This, however, is a mere matter of detail in construction, and the cam-groove may be made in any convenient way. A spring-stop, I, is arranged to engage with the disk-ratchet, as usual, to prevent any backward 60 movement of the latter. The cord-tucker K, I mount upon the corner of the frame opposite to the pawl-lever E, pivoting it so that it may be vibrated by means of the bolt L, passing through the tubular arm k . The upper 65 end of this tubular arm has a bearing in a fork or projection, b , of the frame, and is pro-

vided with a crank-arm, k' , the end of which is arranged to enter the cam-groove f , being preferably provided with an anti-friction roller, k^2 . The tucker is constructed and arranged 70 so that it will be vibrated at the proper time and by the same cam which vibrates the pawl-lever. The function of this device is well-known, and need not be further described here, the only point of my improvement in this con- 75 nection being the construction and arrangement of the device, by means of which it is operated positively by the same cam which actuates the mechanism for operating the cord-holder. By this improvement I simplify the 80 construction of the mechanism very much.

The mechanism for operating the cord-holder is also exceedingly simple and cheap, and taken in connection with the arrangement for operating the cord-tucker my improvement 85 simplifies the machine very materially. It reduces the number of parts employed, enables me to make them comparatively light, and the weight of the knotter-mechanism frame and its attachments is reduced by my 90 present improvement several pounds.

The mechanism is simple and not liable to get out of order, and there is a certainty of action obtained which is desirable in these machines. The importance of these improve- 95 ments is obvious when it is remembered that these machines are taken into the field and drawn about. Every step in the direction of simplifying the mechanism and reducing its weight becomes, therefore, of more than or- 100 dinary importance, and this fact is appreciated by those having anything to do practically with the manufacture or operation of self-binding harvesters.

The precise construction and arrangement 105 of these devices which constitute my improvement may be changed somewhat without changing the essential features of my invention.

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

1. In a grain-binder, a knotter-actuating wheel provided with a cam-groove on its inner side and a cam-track on its periphery, in 115 combination with a stripper constructed and arranged to be operated by the first-named cam-groove, and the actuating mechanism of the cord-holder, constructed and arranged to be operated positively in both directions by 120 the peripheral cam-track, substantially as and for the purposes set forth.

2. In a grain-binder, an actuating-cam, in combination with a cord-holder mechanism and cord-tucker, and intermediate mechanism 125 whereby both are adapted and arranged to be operated by the said single actuating-cam, substantially as and for the purposes set forth.

3. The wheel F, provided with a cam-groove, f , in combination with the cord-holder, the lever E, the pawl G, and the cord-tucker K, provided with the crank-arm k' , all ar- 130

ranged and operating substantially as and for the purposes set forth.

4. The wheel F, provided with a cam-groove on its inner side and a cam-groove on its periphery, in combination with the stripper constructed and arranged to be operated by the first-mentioned cam-groove, the actuating mechanisms of the cord-holder, and the cord-tucker, both constructed and arranged to be operated by the cam-groove on the periphery of the said wheel, substantially as and for the purposes set forth.

5. The wheel F, provided with a cam rim

or flange arranged on its periphery, in combination with the bent plate E, fastened to the outer side of the wheel, the pawl-lever E, which actuates the cord-holder, and the cord-tucker K, all constructed and arranged to operate substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

DANIEL STRUNK.

Witnesses:

W. C. CORLIES,
A. M. BEST.