(No Model.)

4 Sheets—Sheet 1.

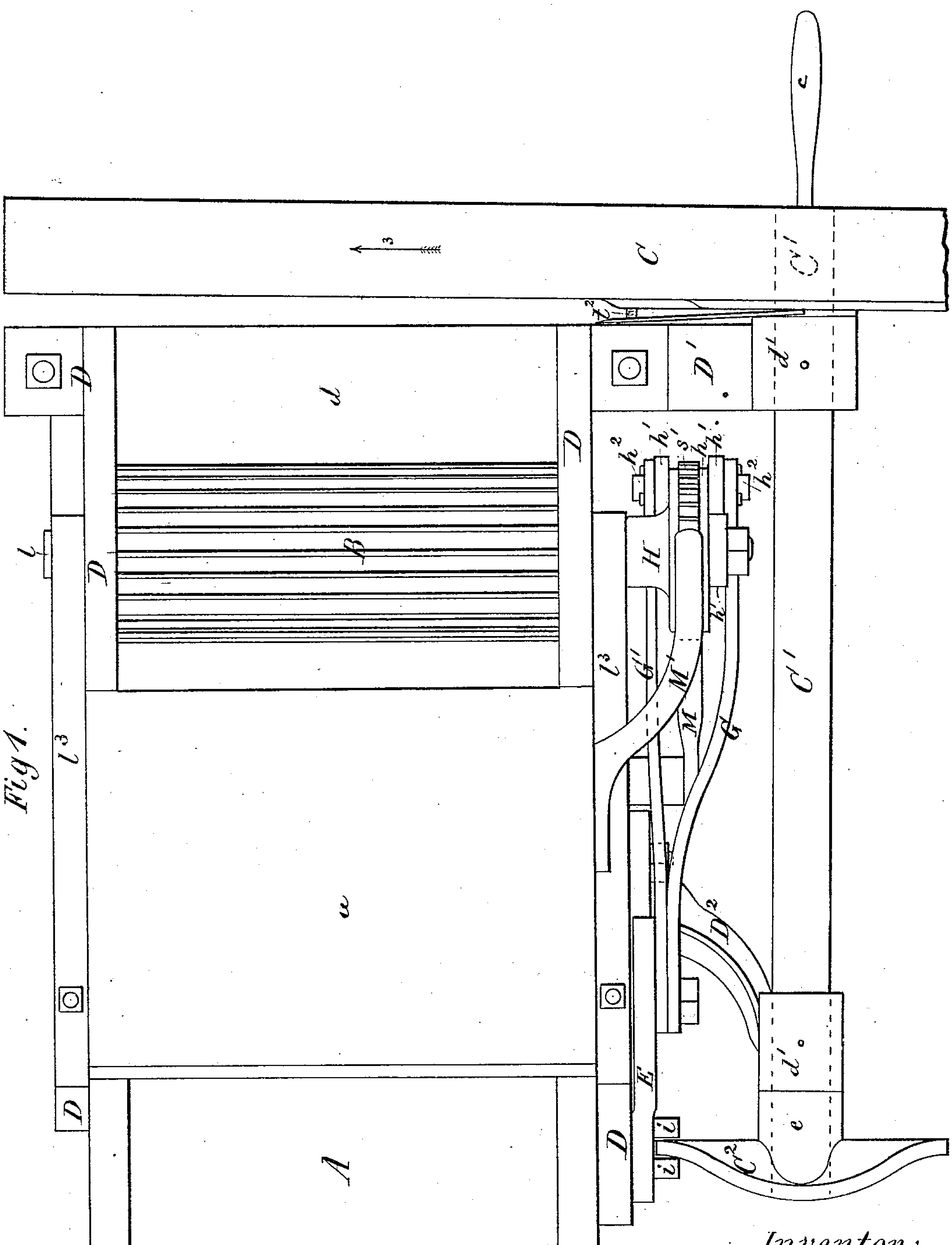
J. K. WILDER.

STRAW CUTTER.

No. 251,013.

Patented Dec. 13, 1881.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

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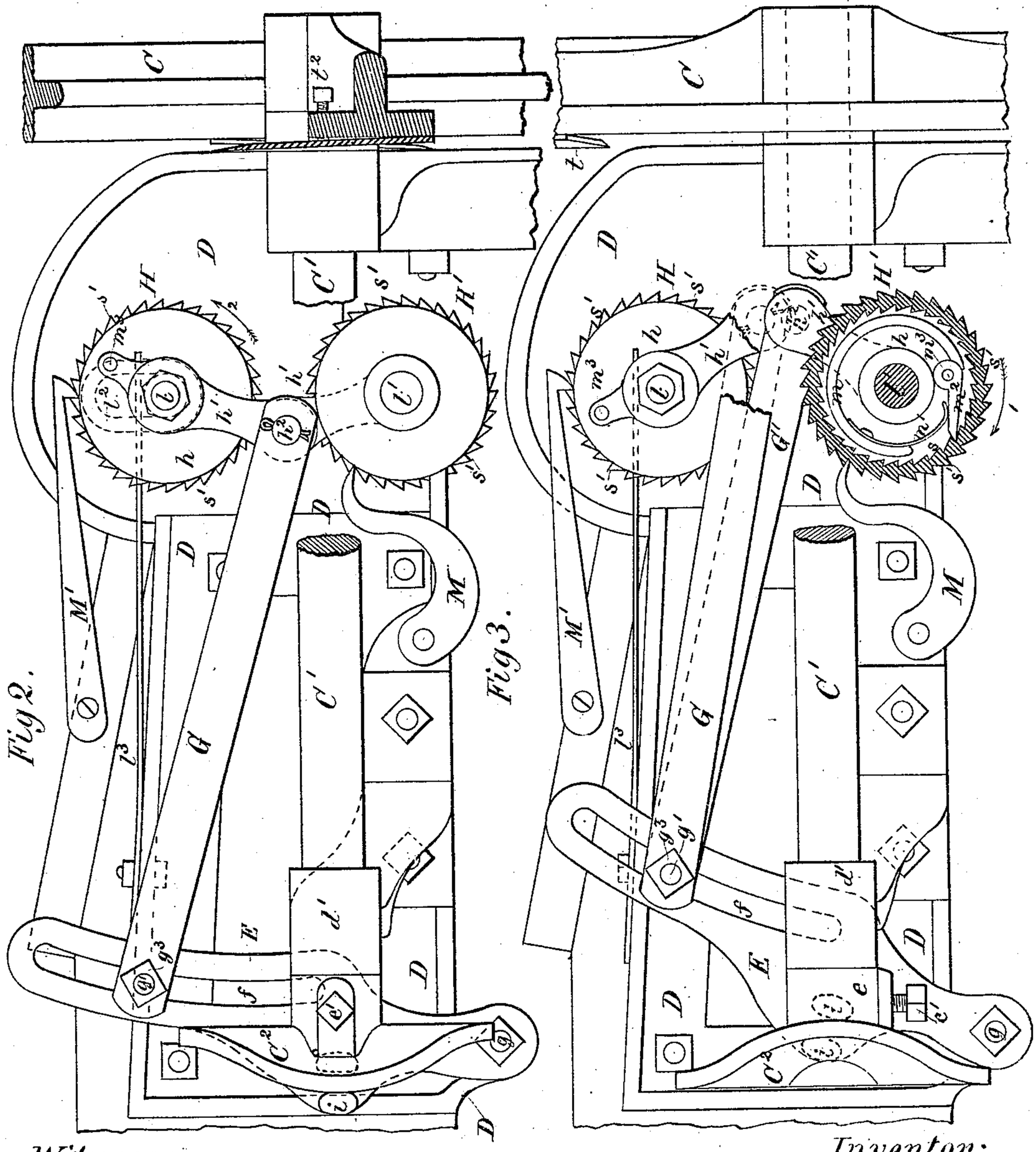

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4 Sheets—Sheet 3.

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Fig 4.

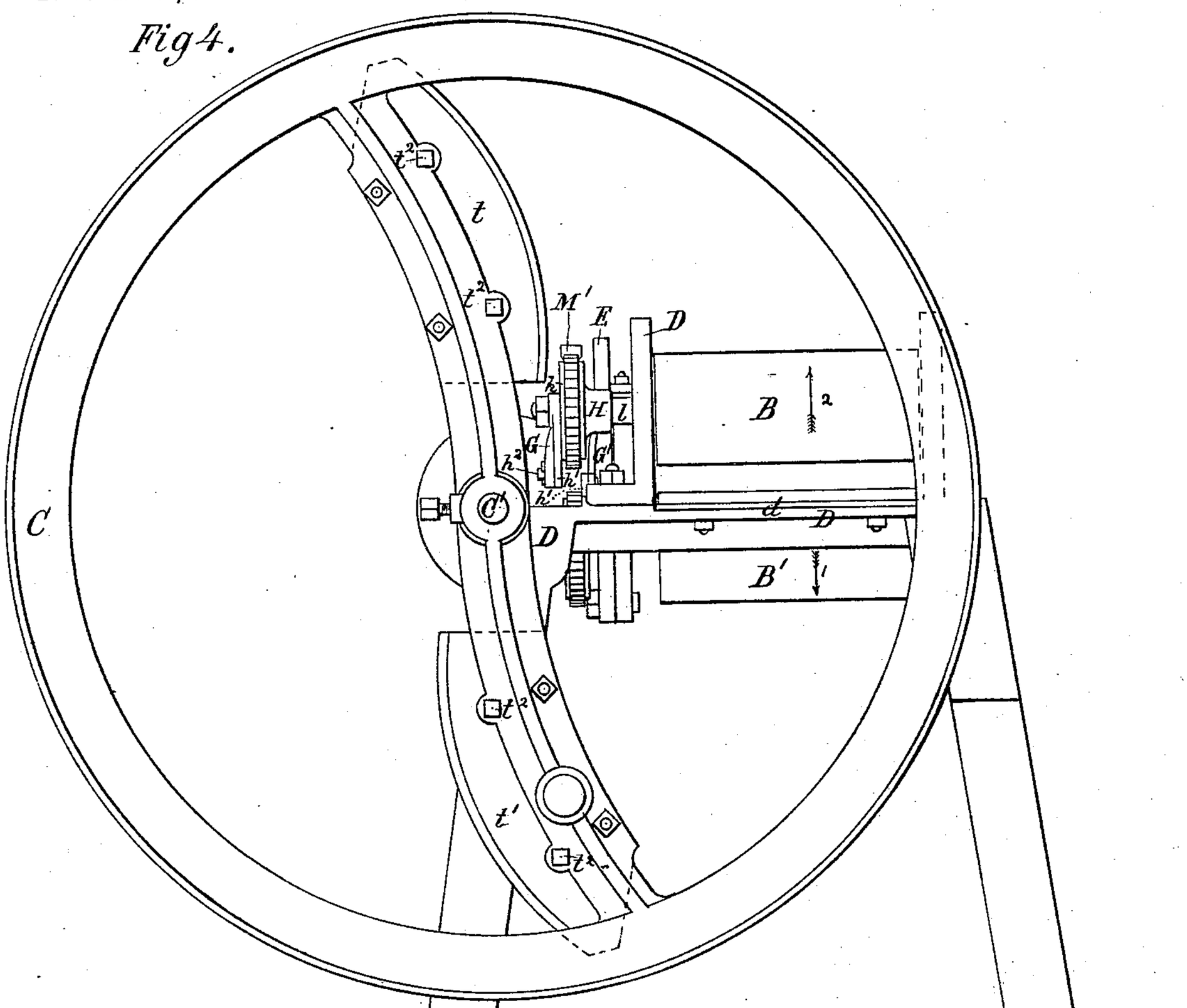
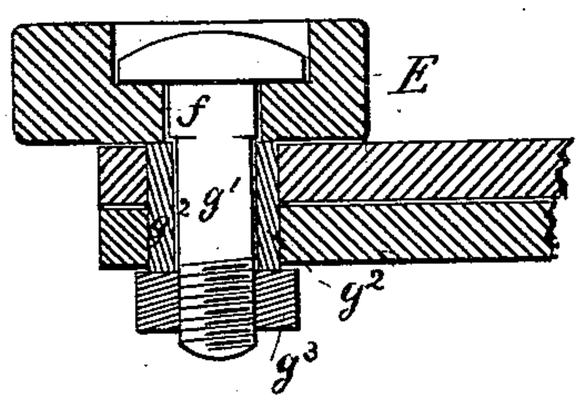


Fig 5.



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(No Model.) 4 Sheets—Sheet 4.

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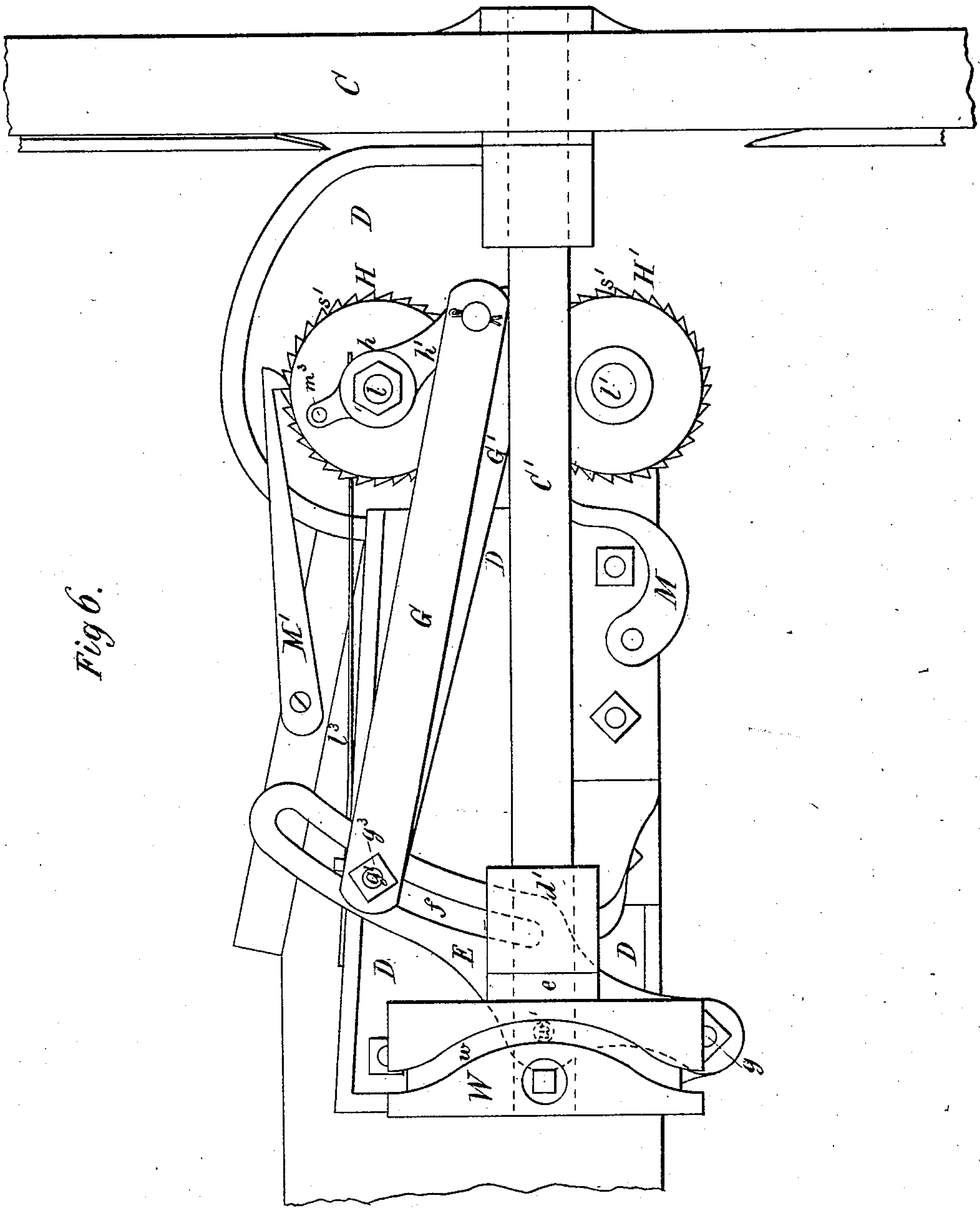

Fig 6.

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UNITED STATES PATENT OFFICE.

JOHN K. WILDER, OF SOUTH TOLEDO, OHIO.

STRAW-CUTTER.

SPECIFICATION forming part of Letters Patent No. 251,013, dated December 13, 1881.

Application filed October 15, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. WILDER, a citizen of the United States, residing at South Toledo, in the county of Lucas and State of Ohio, have invented a new and Improved Straw-Cutter, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which—

Figure 1 is a plan view of my improved machine for cutting straw, hay, and other similar feed for animals. Fig. 2 is a view of the same, mainly in side elevation, but partly in section, showing the double-acting cam and the cam-lever, which simultaneously actuates one bar connected with the upper feed-roll and one bar connected with the lower feed-roll, in a position ready to effect a forward movement of the straw to be cut. Fig. 3 is a like view, showing said cam, cam-lever, and connecting-bars as having made a full forward throw, whereby the straw to be cut has been projected between the feed-rolls ready for the action of the knife. Fig. 4 is a front elevation of the machine; and Fig. 5, a view showing the means of adjustment, whereby the length of the cut straw can be regulated at pleasure of the operator. Fig. 6 is a broken side view of a modification.

The object of my invention is the production of a straw-cutter wherein during the act of effecting a cut the straw shall remain stationary, and so not crowd against the knife during such act, thereby requiring far less power to operate the machine than in the case of straw-cutters wherein the forward movement of the straw is continuous during the act of effecting the cut.

The nature of my invention will fully appear from the subjoined description when considered with reference to the accompanying drawings, forming a part of this specification.

In the drawings, A indicates the cutter-box, provided with the usual guide-board, *a*, to compress and direct the straw to the feed-rolls.

B is the upper feed-roll, located and working directly above a similar lower feed-roll, which two rolls conjointly deliver the straw to the knives applied to the power-wheel C. This power-wheel is provided with a handle, *c*, by which the machine can be operated, if desired.

The cutter-box is provided with a metal frame, D, which is bolted to the sides of the forward end of the cutter-box, as indicated in the figures, the forward cross portion *d* of which frame serves the purpose of a metal bed, upon which the straw rests as it receives the cutting action of the knives. On one side of the box the frame D is extended outwardly, as at D′, and terminates in an annular bearing, *d′*, for the support of an axial shaft, C′, to which wheel C is attached, and in which bearing *d′* the shaft C′ turns as the power-wheel C is rotated in the act of operating the machine. A bracket, D^2, bolted to the metal frame D, as indicated in the figures, also outwardly terminates in an annular bearing, *d′*, through which the power-shaft C′ passes, as shown, and in this manner the means is afforded for firmly sustaining said shaft in horizontal position, as well as also supporting the wheel C, said shaft passing through said wheel at its center or axis, and the two are keyed together.

C^2 indicates a waved metal cam, cast with an annular hub, *e*, through which hub the shaft C′ extends, and the cam is keyed to the shaft by a fastening-screw, *e′*, passed through the hub, as indicated in Fig. 3. This cam is a four-waved cam—that is to say, its face surfaces from the hub *e* to the perimeter of the cam present two waves or convexities opposite to each other to the right of a vertical plane transverse to the eye or axis of the cam and two like convexities opposite to each other to the left of said vertical plane, all four of the convexities being of the same size and form, and with the waves or convexities alternating to the right and to the left along the perimeter of the cam. It will thus be seen that when the cam C^2 is rotated there will be two throws of the cam to the right hand, or forward, and two throws to the left hand, or backward, during a single revolution of the cam.

E is a lever, having its upper limb provided with a curved slot, as at *f*, and with its lower limb confined in position by a screw-nut upon a bolt, *g*, which passes through said lower limb and a downwardly-extended portion of the frame D, the bolt *g* serving also as a fulcrum of articulation for said lever. This lever is also provided with two knobs, as at *i i*, be-

tween which the cam C^2 is free to rotate, as shown, the space between the knobs being somewhat greater than the thickness of the cam occupying said space.

G and G′ are connecting-bars between the lever E and the feed-rolls B B′, as will be presently described, and which receive longitudinal movement forward and back by the rotation of the cam C^2 between the knobs *i i*. The bars G G′, at their rear ends, are perforated to receive a bolt, *g′*, which passes through them, and which has a head of greater diameter than the curved slot *f*. The body of this bolt, from the inner face of its head, is made square a portion of its length equal to one-half the thickness of the lever E, as shown in Fig. 5, and so as to fit loosely but not to turn within the slot *f* of said lever, while the remaining length of the body portion of the bolt which passes through the bars G G′ is made round, and upon this rounded portion of the bolt a thimble, g^2, is loosely fitted, the diameter of which thimble is greater than the diameter of the slot *f*, while the length of said thimble is somewhat greater than the combined thickness of said bars. So when the nut g^3 is screwed up tight against the thimble the opposite end of the thimble will be forced against the lever E on one side, while the inner face of the head of the bolt *g′* will be forced against an opposite surface of the lever E, and thus hold the rear ends of the bars G G′ at any desired position, up or down, within the slot *f*, while at the same time said bars are allowed freedom to articulate upon the thimble and bolt. I make this provision for adjusting the rear ends of the bars up and down in given fixed positions upon the lever E, since by so doing the forward and back throw of said bars may thereby be increased or diminished at pleasure and a greater or less feed of the straw supplied between the feed-rolls, and thus a greater or less length of straw may be cut at pleasure.

The axle-shafts *l l′* of the feed-rollers B B′ have their bearing in the metal frame D, the shaft *l* at each end of the roll B being permitted to rise and fall in vertical openings of the frame, one of which openings is shown in dotted lines at l^2 in Fig. 2, and thus allow the roll B to accommodate itself to inequalities in the thickness of the mass of straw while being fed forward by the rolls. Springs, as at l^3, having their rear ends bolted to the frame D, and with their forward portions resting upon the axle *l* at each end of the feed-roll B, keep said roll down to its work, whatever may be the rise and fall of the roll.

H and H′ are disk-wheels cast with double ratchets, and are firmly fixed to the respective axis-shafts *l l′* of the feed-rolls B and B′. Each of these disk-wheels is provided with an outer and inner series of ratchet-teeth, *s* and *s′*, (see section, Fig. 3,) as well as with a disk-plate carrying a ratchet-pawl and pawl-spring, as will be described.

A disk-plate (shown at *h* in the figures) is arranged to abut against the respective disk-wheels, and so hold in working position a pawl applied to its inner surface to engage with the series of ratchet-teeth on the interior surface of the disk-wheel. As shown in connection with the disk-wheel H of the upper feed-roll, said plate *h*, on its outer surface, is constructed or cast with a short lever-arm, *h′*, and to a wrist-pin, h^2, of said arm, the forward end of the connecting-bar G is applied to freely articulate, as indicated in the figures. The shaft of the lower feed-roll, B′, (see Fig. 3,) is in like manner provided with a disk-wheel, H′, a disk-plate, *h*, a short lever-arm, *h′*, and a wrist-pin, h^2, to which the forward end of the connecting-bar G′ is applied to freely articulate; but in this instance the disk-wheel and disk-plate are set in a reverse position upon the shaft *l′* of the feed-roll B′ from that occupied upon the shaft *l* of feed-roll B, and hence the series of exterior and interior ratchet-teeth of disk-wheels H and H′ will also occupy relatively reversed working positions. On the shaft *l′* of the lower feed-roll in Fig. 3 these exterior and interior series of ratchet-teeth, *s* and *s′*, are shown in section, and a portion of the disk-wheel H′ is removed, so as to expose its disk-plate *h* in rear. In this view (Fig. 3) the disk-plate *h* of the disk-wheel H′ is provided on its inner surface with a raised portion of partly circular form, as at *m*, to which a spring, *m′*, is applied, as indicated, to keep a pawl, m^2, engaged with the interior series of ratchet-teeth *s*. This pawl is connected to the disk-plate by a pivot, m^3, upon which the pawl articulates, while the rear portion of the pawl is made to abut against and be supported by one end of the part *m*. This same construction of disk-plate, spring, and pawl is common to the disk-wheels of both feed-rolls, B and B′, but set in reverse positions. Now, it will be seen that when slotted lever E is in the act of being thrown forward from its position shown in Fig. 2 to its position shown in Fig. 3 the connecting-bar G′ will force its short lever-arm *h′* from its position occupied in Fig. 2 to its position shown in Fig. 3, thereby turning the disk-plate *h* of disk-wheel H′ from the position it occupies in Fig. 2 into its position shown in Fig. 3, thereby, through the action of the pawl m^2 upon one of the interior ratchet-teeth *s*, rotating the lower feed-roll, B′, in the direction of the arrow 1, and so effecting a feeding action of said lower roll. Further, it will be seen that when the short lever-arm *h′* of the disk-wheel H′ is thrown back from its position in Fig. 3 to its position in Fig. 2 by the rearward throw of the bar G′ the pawl m^2, Fig. 3, will be drawn along over the interior ratchet-teeth, *s*, of the disk-wheel H′ a distance equal to the rearward throw of the bar G′, and that, inasmuch as the disk-plate *h* revolves freely upon the axle-shaft *l′* during such act, the lower feed-roll meantime will remain stationary, and that any tendency to a movement in a direction reverse to that indicated by the arrow 1 will be prevented by the pawl M engaging with one of the exterior ratchet-teeth of the disk-wheel H′. It will also be

understood that since the interior and exterior ratchet-teeth provided for the disk-wheel H of the upper roll, B, occupy a "set" or position exactly reverse of that occupied in connection with the disk-wheel H′ of the lower feed-roll, B′, the forward and rearward throws of the bar G simultaneous with that of the bar G′ will have the same effect upon the upper feed-roll as that produced upon the lower feed-roll through its bar G′. In other words, on the forward throw of the bar G the feed-roll B will be rotated in the direction of the arrow 2, and so cause the roll to help feed the straw forward, while during its rearward throw the upper roll, B, will stand still, and thus both rolls will revolve as well as stand still simultaneously.

I will here state that the pawl M′ serves the same purpose during the rearward throw of the bar G that pawl M serves during the rearward throw of the bar G′.

In Fig. 4 the machine is represented in front elevation, with the drive-wheel C armed with two cutter-knives, *t t′*, secured to central cross-arms of the wheel, as shown, the adjustment of the knives being effected by the screw-bolts t^2 in a well-known manner.

We will now suppose that the machine, after having been in operation for a time, has stopped, and with the knife *t* vertically over the knife *t′*, and with all the other operating mechanism in the position shown in Fig. 3, and with the feed or straw still between the feed-rolls B B′, and with a portion thereof projected forward upon the cutter-bed *d*, ready for a cut of the knife *t*. With this position of the several operating parts and the straw the machine is now set in operation by turning the wheel C in the direction of the arrow 3. The knife *t* now moves forward and makes its cut, and during this act the cam C^2 will retract simultaneously the lever E, the bars G G′, and the disk-plates *h* from their positions occupied in Fig. 3 to their positions indicated in Fig. 2, the feed-rolls B B′ remaining stationary. The knife *t* now moves on until it reaches a position exactly the reverse of its original position, or a position it will occupy when the wheel C has completed a half-revolution; and while so doing the cam C^2 will simultaneously throw forward the lever E, the bars G G′, and disk-plates *h* from their positions in Fig. 2 to their positions shown in Fig. 3, thus bringing into action the pawls of the disk-plates of the feed-rolls, and thereby rotating the feed-rolls in the direction of the arrows 1 and 2 a sufficient distance to project the feed or straw ready to be cut by the knife *t′*, such projection of the straw being made by the feed-rolls after the knife *t* has passed below the mouth of the cutter-box and out of the way of the straw. The wheel C being now made to complete another half-revolution, a cut of the straw will be made by the knife *t′* in its turn, the operation of all the parts being the same as during the first half-revolution of the wheel C.

It will thus be seen that during one complete rotation of the drive-wheel C and cam C^2 two lengths of the feed or straw will be cut; that during the act of cutting the feed-rolls B B′, as well as the feed or straw, will remain stationary, and that the feed-rolls deliver a length of straw to be cut off at a time when the action of the feed-rolls will not force the feed or straw against the knives, thereby greatly reducing the power necessary to operate the machine. This same action of the machine can be effected by substituting in place of the cam C^2 a wheel, W, having a groove, *w*, in its periphery corresponding with the waves of the cam C^2, as indicated in Fig. 6, and with a single pin, *w′*, projecting from the lever E to work in said groove.

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

1. The combination of the four-waved cam-wheel C^2, slotted lever E, bars G G′, disk-wheels H H′, disk-plates *h*, feed-rolls B B′, and drive-wheel C, provided with two cutter-knives, substantially as and for the purpose described.

2. The four-waved cam-wheel C^2, in combination with the lever E, provided with a slot, *f*, and adjustable bars G G′, held in position together at their rear ends by a single bolt, *g′*, and nut g^3, substantially as and for the purpose described.

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