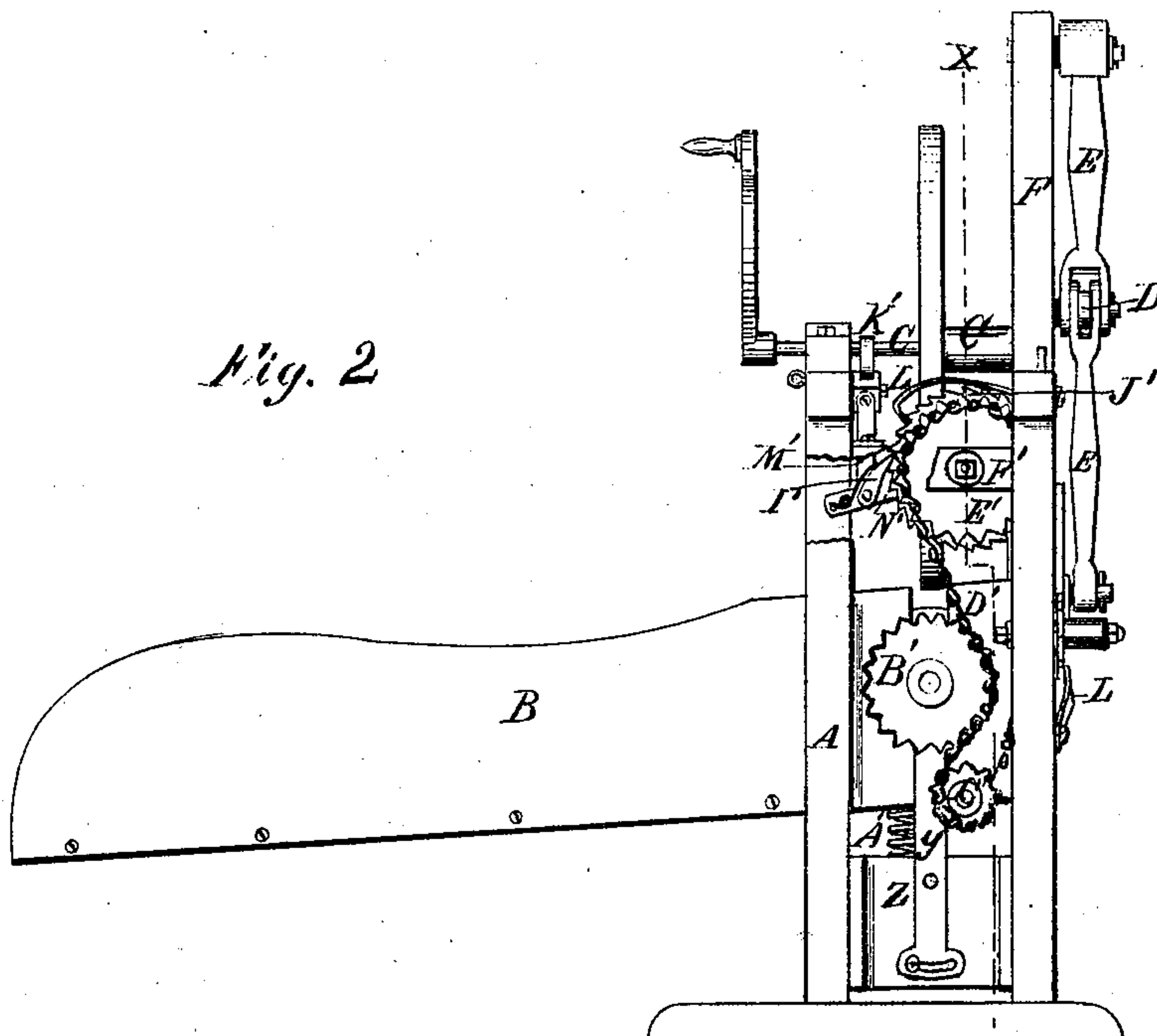
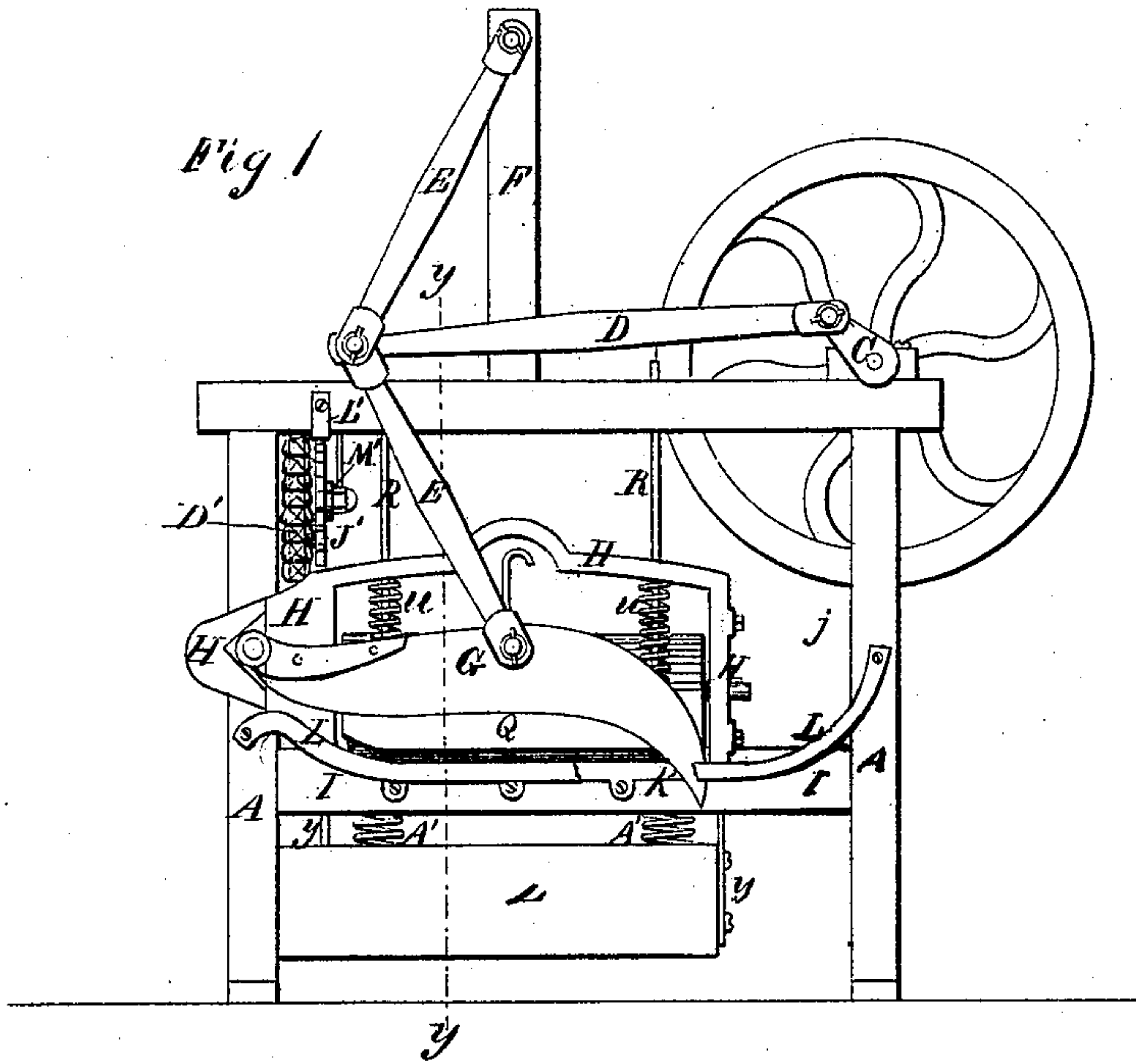


L. SCOFIELD.
STRAW-CUTTER.

No. 178,676.

Patented June 13, 1876.



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W. C. Church

X INVENTOR;

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By Nile Alessworth
His Attor

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Fig. 3

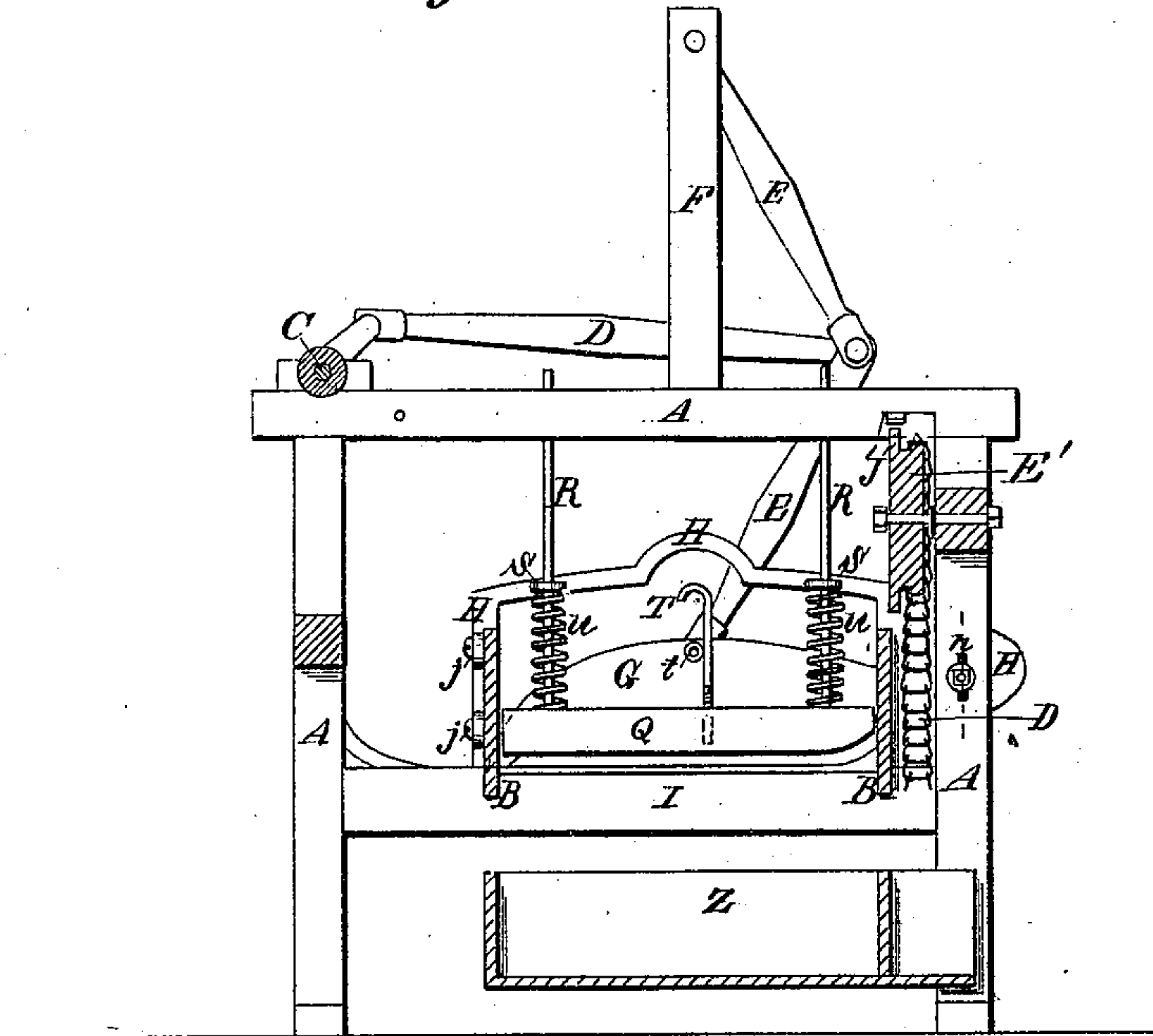
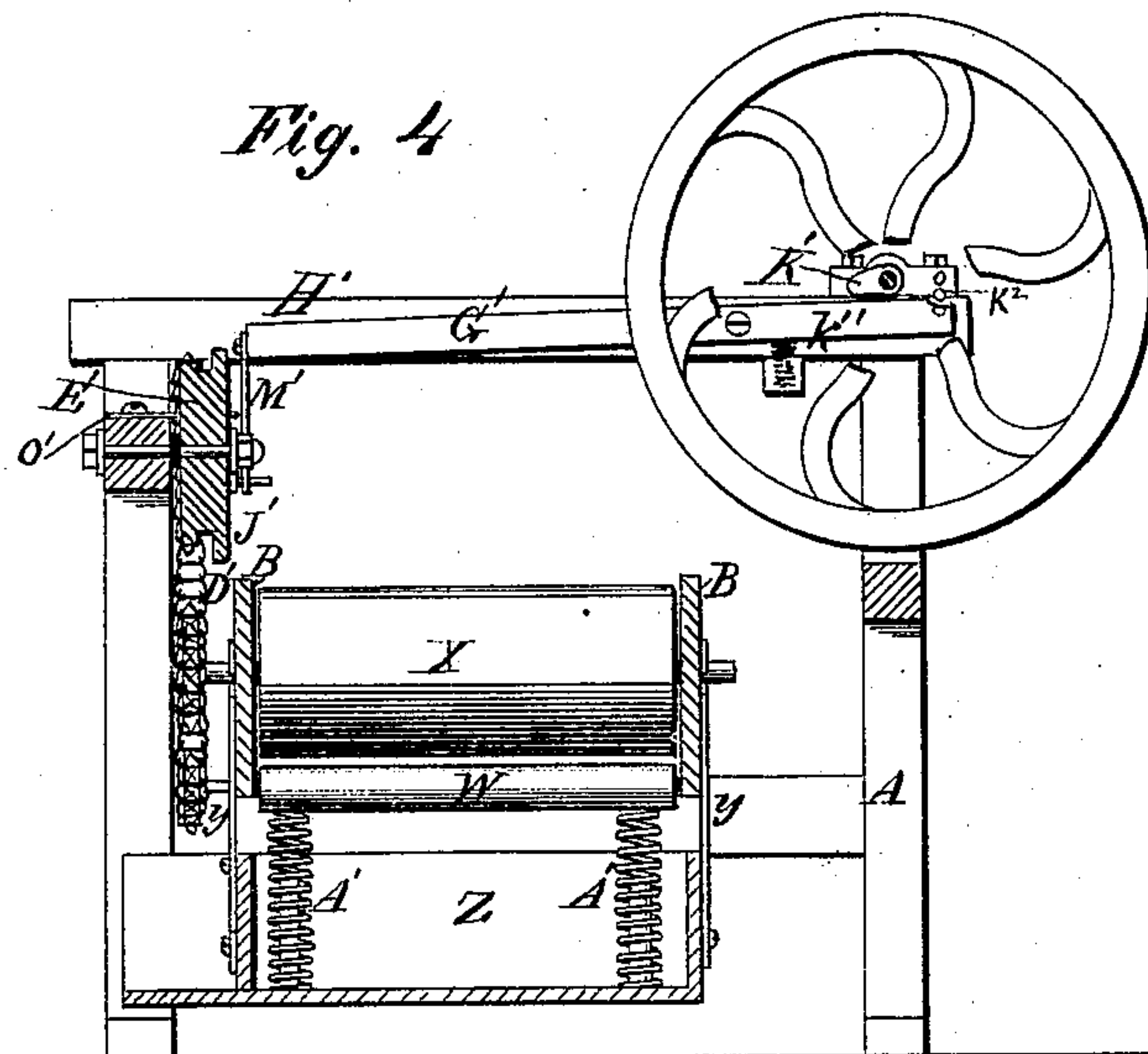


Fig. 4



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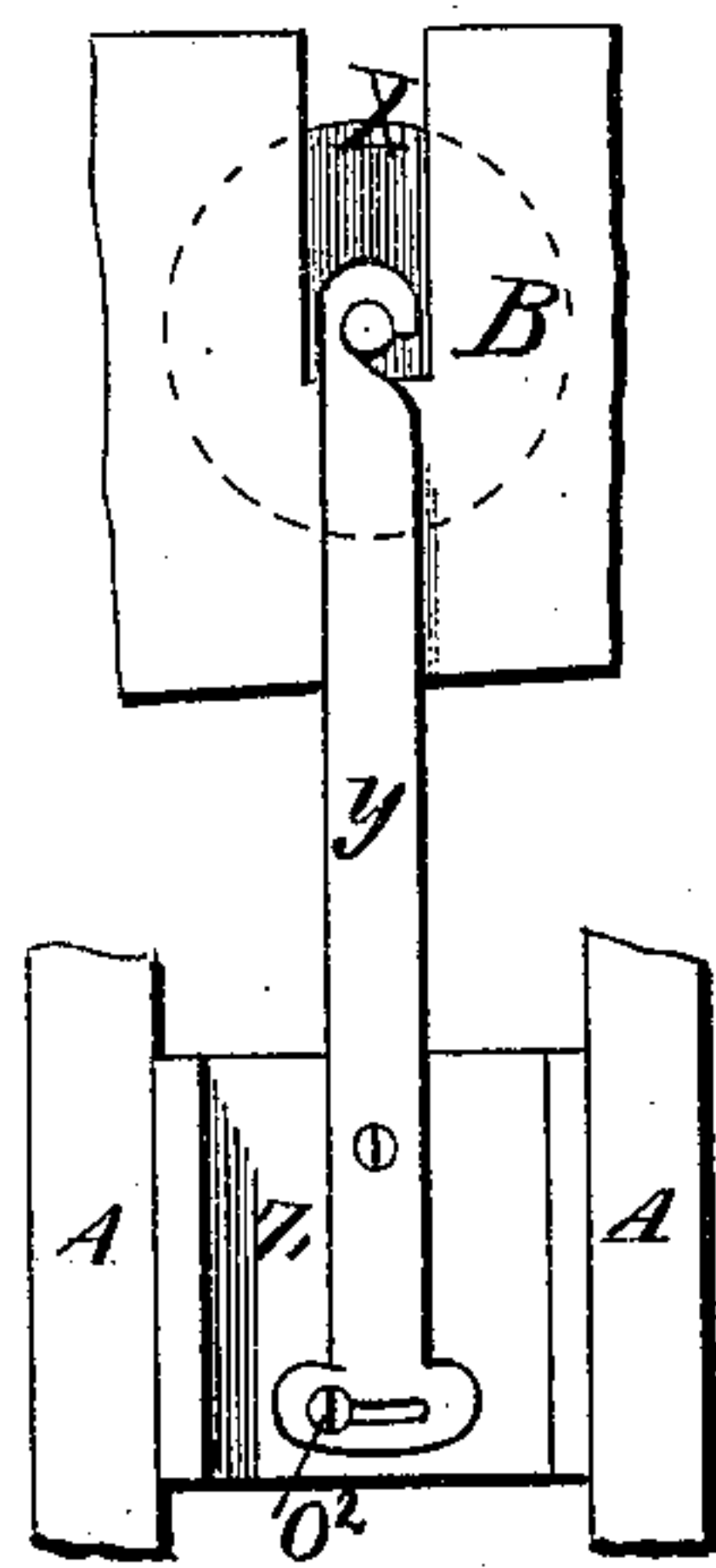
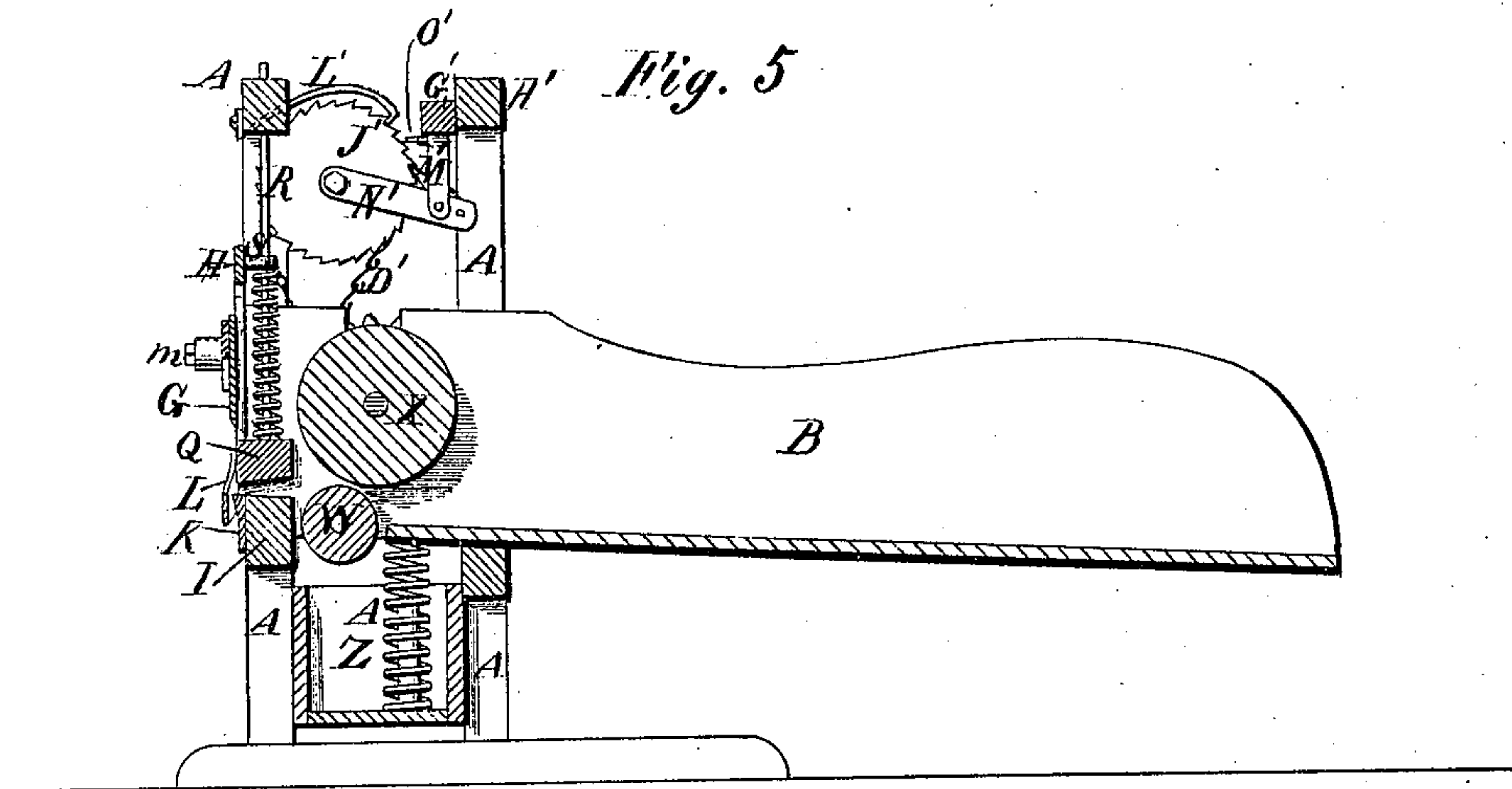


Fig. 7

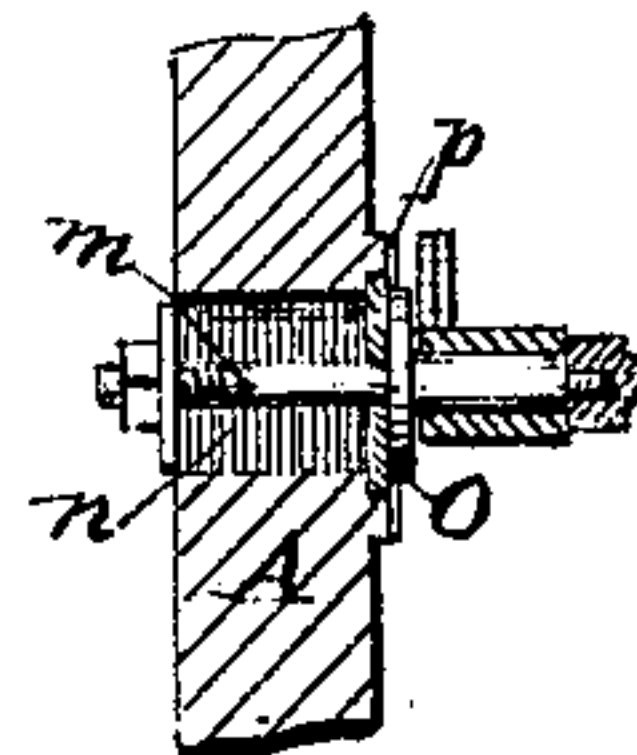


Fig. 6

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UNITED STATES PATENT OFFICE.

LEVI SCOFIELD, OF GRAND HAVEN, MICHIGAN.

IMPROVEMENT IN STRAW-CUTTERS.

Specification forming part of Letters Patent No. **178,676**, dated June 13, 1876; application filed September 27, 1875.

To all whom it may concern:

Be it known that I, LEVI SCOFIELD, of Grand Haven, in the county of Ottawa and State of Michigan, have invented certain new and useful Improvements in Hay and Straw Cutters; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1, Sheet 1, is a front elevation. Fig. 2, Sheet 1, is a side view, partly in section. Figs. 3 and 4, Sheet 2, are transverse sections taken through the line *x x*, Fig. 2, and looking, respectively, to the front and rear of the machine. Fig. 5, Sheet 3, is a longitudinal section, taken through the line *y y*, Fig. 1. Fig. 6, Sheet 3, is a sectional view, showing the method of pivoting the cutting-knife to the frame. Fig. 7, Sheet 3, is a detached view, showing the method of connecting the upper roller with the counter-balance.

Similar letters of reference in the accompanying drawings denote the same parts.

My invention relates to that class of feed-cutters which employ a pivoted reciprocating knife in connection with suitable feed-rollers; and it has for its object to improve the construction and operation of the same. To this end the invention consists in pivoting the knife to the frame in such a manner that it can be adjusted vertically with respect to the bed or hay support, so that when the width of the knife is decreased by notches or grinding its cutting-edge can be lowered to coincide with the hay-support, and thereby insure the proper cutting action at the heel or rear portion of the knife. It further consists in adjusting the throw of the spring-pressure piece to correspond to the throw of the knife. It also consists in providing the feed-rollers with toothed wheels driven by a chain from a ratchet-wheel pivoted to the frame of the machine, such ratchet-wheel being, in its turn, operated by a pawl-lever from the shaft of the balance-wheel. It also consists in the provision of means for tightening the chain. It finally consists in the construction and combination of various parts, as I will presently describe.

In the accompanying drawings, A is the

upright frame of the machine, provided upon one side with the feed-trough B in the usual manner, and with a fly-wheel and shaft, C, at one of its upper corners. The front end of the shaft is formed with a crank, which is connected by a pitman, D, with the central joint of a vertical toggle-lever, E, whose upper arm is hung to the side of an upright, F, mounted upon the top of the frame. The lower end of the toggle-lever is pivoted to the back of a curved knife, G, near the center thereof, and one end of the knife is pivoted to the side of the frame, as shown. The cutting-edge of the knife is curved upward at the rear end and downward at the point, so that when operated from the driving-shaft by the pitman and toggle-lever, it is forced through the hay or straw with a shearing cut throughout its entire length, the greatest force of the lever being exerted at the heel or rear of the knife, where it is most required.

H is a metal frame, in the general form of a rectangle, secured to the front bar I and one of the uprights of the main frame. The frame H is equal in size to the front of the feed-trough, and is secured thereto at its inner end by screws and lugs *j*, as shown in Figs. 1 and 3. The lower side piece of this frame forms the inner guard K, next the knife, to support the hay or straw while being cut, a strip of metal, L, extending across the frame in front of the knife, forming the outer guard and hay-support. This guard also forms a spring, to press the knife inward against the guard K, for the purpose of insuring the proper cutting action. The upper edge of the inner guard K is curved upward next the upright, to hold the hay up within the path of the knife, and the outer guard L is correspondingly curved for the same purpose. The upward curvature of the outer guard increases its strength and elasticity at the heel of the knife, where the greatest force of the cut is required.

The knife is hung upon a pin, *m*, which passes through a vertical slot, *n*, in the metal frame H and upright of the frame, as shown in Fig. 6, and is provided with a triangular metal plate, *o*, to bear against the outer face of the frame. A nut and washer on the inner end of the pin draws the plate *o* up to its bearings, and holds the pin in place. It is pre-

vented from turning with the movements of the knife by fitting one edge of the triangular plate up against a shoulder, *p*, formed on the metal frame, as shown in Figs. 1 and 3.

By this means the knife is made adjustable vertically, and when its edge is ground away or notched it can be lowered to coincide with the hay-supports K L—that is to say, if the width of the knife is so far decreased by grinding its edge that the latter will not reach the hay-supports in its descent, it cannot, of course, cut the hay; but by lowering the pin in its slot *n*, the knife is dropped down until the edge will sweep past the support and again perform its work.

Q is the pressure-piece, placed within the end of the feed-trough, just behind the knife, and suspended from rods R R, which pass upward through lugs S S on the back of the metal frame H, and then through the front top piece of the main frame.

The pressure-piece is lifted by the knife in the following manner: The lower pivotal pin of the toggle-joint projects through the knife sufficiently to receive a roller, *t*, upon its inner end, which, when the knife ascends, comes in contact with a hooked rod, T', screwed into the top of the pressure-piece, and raises the latter for the feed of the hay beneath it. When the knife descends the pressure-piece is thrown down upon the hay, to hold it in place while being cut, by means of springs U U, mounted upon the guide-rods R, between the pressure-piece and lugs S, as shown in Fig. 3. The hooked screw-rod is so arranged that the springs shall throw the pressure-piece down upon the hay before the knife begins to cut; and it is adapted to be screwed into the pressure-piece, to regulate the movement of the latter in accordance with the vertical adjustment of the knife.

If desired, the roller *t* may be mounted upon the toggle-lever by a separate stud; but its arrangement I regard as a matter of choice only.

W is the lower feed-roller, having its bearings in the end of the feed-trough behind the pressure-piece, and X is the large upper feed-roller, arranged with its journals in open slots cut in the sides of the feed-trough. Y Y are bars or catches hooked over the journals of the upper roller outside the trough, and secured firmly to the ends of an open box, Z, placed beneath the frame. One end of this box extends between the front and rear uprights of the frame, by which it is guided and prevented from being displaced laterally. The box forms a support for spiral springs A', which bear against the bottom of the feed-trough and force the large feed-roller, through the medium of the hook-bars, down upon the small one, with a yielding pressure. If desired, weights may be used in the box instead of the spiral springs, or both springs and weights may be employed at the same time. B' and C' are large and small toothed wheels secured respectively to the journals of the large and small feed-rollers

outside the feed-trough, and at that end of the frame carrying the knife. An open-linked chain, D', passes around the lower wheel C', and thence upward over a somewhat larger toothed wheel, E', mounted upon the inside of a cross-bar, F', at the top of the frame.

One side of the chain is pressed toward the opposite side by the large wheel B', and the teeth of these three wheels enter the open links of the chain, which is operated as follows: G' is a long lever extending nearly the whole length of the frame from immediately under the driving-shaft to the toothed wheel E'. It is pivoted, near the shaft, to the inner side of the rear top bar H', and carries a spring-pawl, I', at its opposite end to engage with ratchet-teeth J', formed upon the inner face of the toothed wheel E'. The pawl-lever is operated by a cam, K', on the driving-shaft, and a spring, K'', supported by the frame under the short arm of the lever, between its fulcrum and the cam. When the shaft rotates, the cam and spring vibrate the outer end of the lever and cause the pawl to feed forward the ratchet-wheel J' and toothed wheel E' one or more teeth at each vibration. This imparts an intermitting motion to the chain, and, through the toothed wheels B' C', communicates a like motion to the feed-rollers, the various parts of the feeding devices being so adjusted that the rollers shall feed forward the material to be cut when the knife ascends, and hold it still when the knife descends. The feed of the material between the rollers is regulated by adjusting the throw of the spring-pawl to engage a greater or less number of ratchet-teeth J'. This is effected by inserting a pin, K², in one or the other of a series of holes made in the frame immediately over the short arm of the lever K', as shown in Fig. 4. The ratchet-wheel is held against backward movement by the spring-catch L', secured to the frame, as shown in Fig. 5, and the lower end of the arm M', which suspends the spring-pawl from the cam-lever, is jointed by an arm, N', to the shaft or stud of the ratchet-wheel for the purpose of insuring proper movement of the pawl.

When the machine is running at good working speed the momentum of the ratchet-wheel is apt to carry more than the required number of teeth past the spring-pawl, and so make the feed irregular. To prevent this I place a stop, O', upon the frame above the pawl, against which the latter strikes in its upward thrusts, and is thereby directed between the ratchet-teeth with absolute certainty.

The driving-chain of the feed-rollers is tightened by moving the toothed wheel B' of the upper roller against one side of the chain. For this purpose the journal at that end of the feed-roller is given a slight lateral play by widening the bearing-slot in the side of the feed-trough. The hooked bar Y is also hung to the end of the box Z by a single bolt, and its lower end is slotted laterally for the passage of a set-screw, O², into the box. By

loosening this screw the hooked bar is turned on its pivot to move the end of the upper feed-roller and press the wheel B' against the chain, where it is held by again tightening the set-screw.

Having thus described my invention, what I claim is—

1. The combination of the crank-shaft, the pitman, and the toggle-lever with the pivoted knife, substantially as described, for the purposes specified.

2. The arrangement of the toggle-lever upon the frame-support F, connecting with the pitman of the crank-shaft, and with the back of the pivoted knife at the center thereof, substantially as described, for the purposes specified.

3. The pivoted adjustable knife, combined with the hay or straw support, substantially as described, for the purposes specified.

4. The knife-pivot, constructed with a triangular plate, *o*, at such a point of its length that the end of the pivot shall receive the knife in front of the plate, substantially as described.

5. The combination of the triangular plate *o* and shoulder *p* with the vertically-adjustable pivot of the knife, substantially as described, for the purposes specified.

6. The elastic knife-guard L, combined with the frame of the machine and the inner guard K, and constructed with the strengthening and guiding curvature in front of the heel of the knife, corresponding to the curvature of the inner guard in rear of the knife-heel, substantially as described, for the purposes specified.

7. The metal frame H, constructed with the shoulder *p*, to receive the edge of the triangular plate on the knife-pivot, and with its lower side piece forming the curved inner guard K at the heel of the knife, substantially as described.

8. The combination of the pivoted adjustable knife with the metal frame H, substantially as described, for the purposes specified.

9. The spring-pressure piece Q, operated from the knife, and adapted for adjustment to correspond to the vertical adjustment of the knife, substantially as described, for the purposes specified.

10. The counterbalancing-box Z, in combination with the laterally-adjustable upper feed-roller, and guided and held against lateral movement by two end uprights of the main frame, substantially as described, for the purposes specified.

11. The spring-pawl I', vibrating pawl-lever G', and the cam-driving shaft, in combination with the ratchet and toothed wheels J' E', mounted upon the frame of the machine, the toothed wheels B' C' on the end of the feed-rollers, and the single driving-chain D', the various parts being arranged as described with relation to each other, for the purposes specified.

12. The pawl-arm M', connected to the shaft or stud of the wheel J' E' by the arm N', and operated from the driving-shaft by the pivoted bar G', substantially as described, for the purposes specified.

13. The arrangement of the stop O¹ with respect to the wheel J' E' and the spring-pawl I', substantially as described, for the purposes specified.

14. The adjustable hook-bar Y, having a suitable pivoted support, combined with the loose journal of the upper feed-roller, to adjust the toothed wheel B' against the feed-chain, substantially as described, for the purposes specified.

LEVI SCOFIELD.

Witnesses:

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F. MCKENNY.