

(No Model.)

F. BENTEL & J. T. GARDNER.

HORSE HAY RAKE.

No. 343,692.

Patented June 15, 1886.

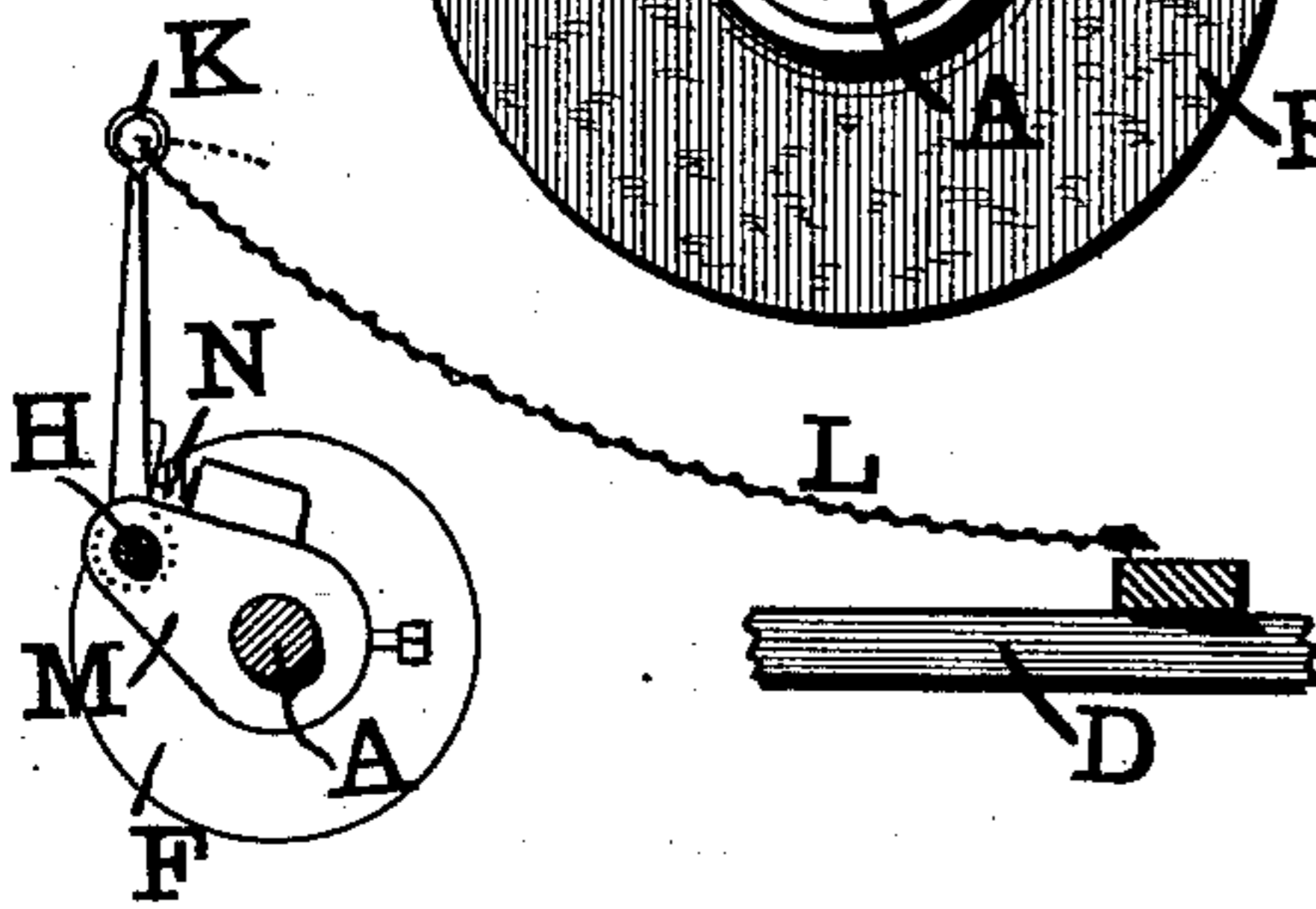
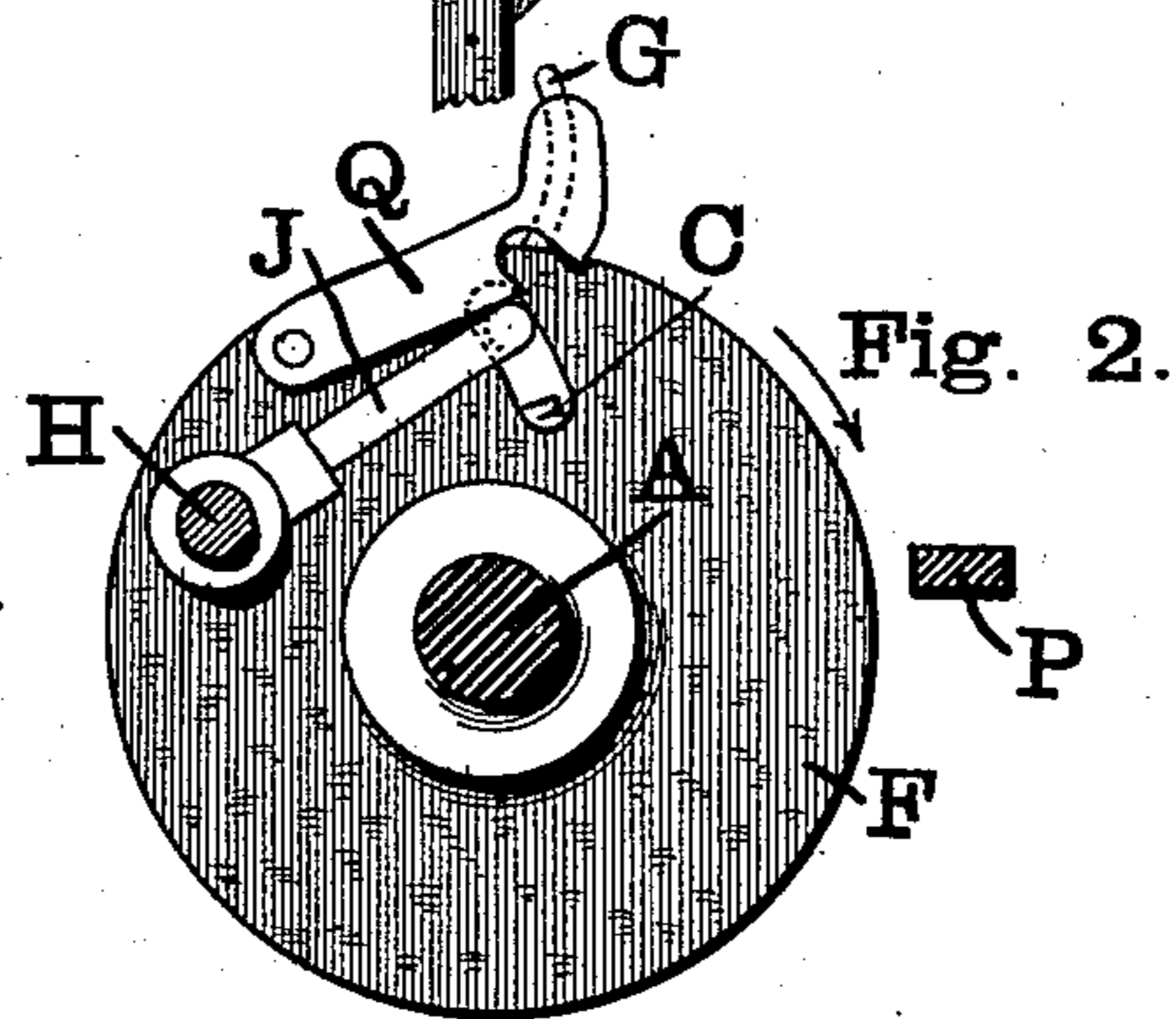
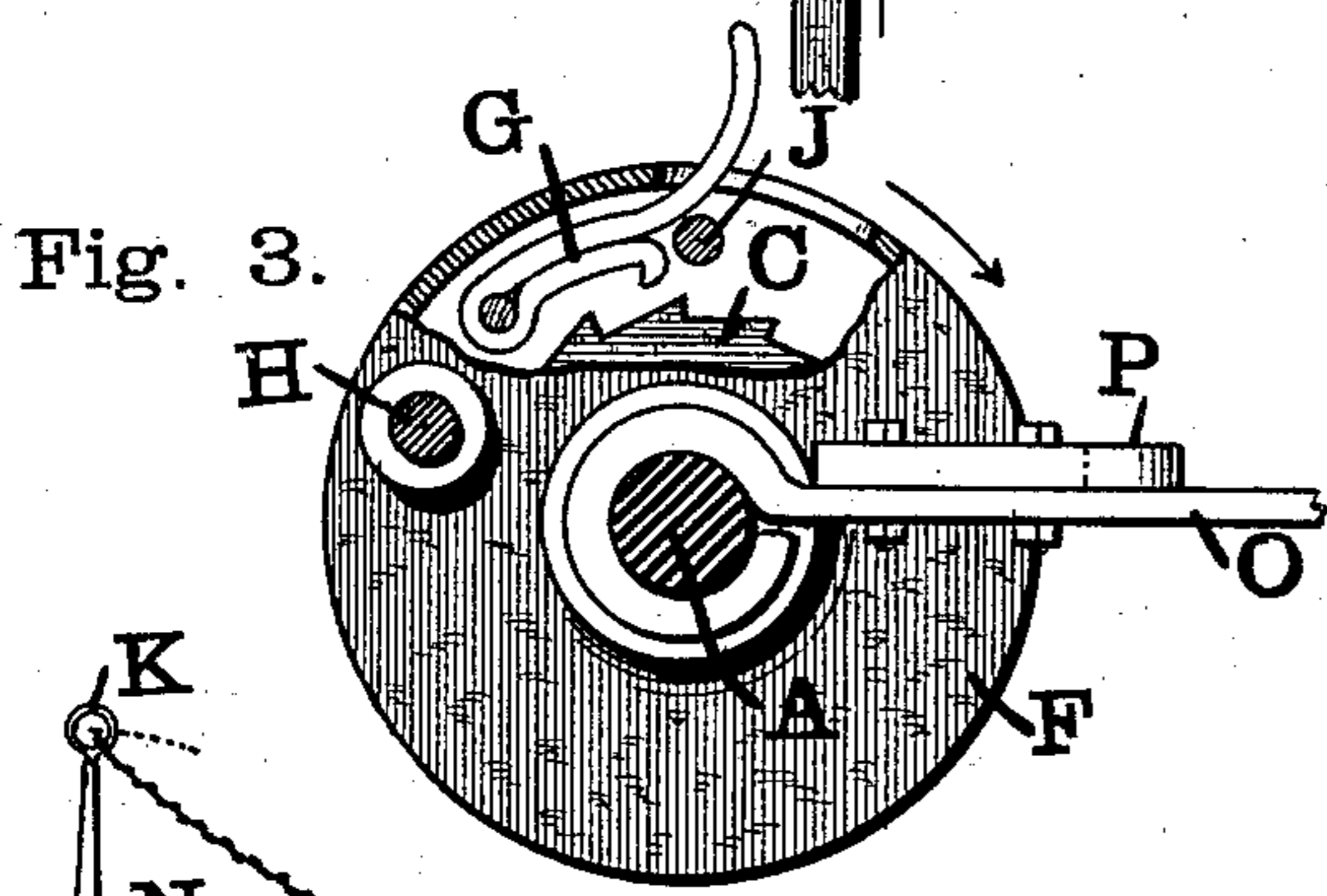
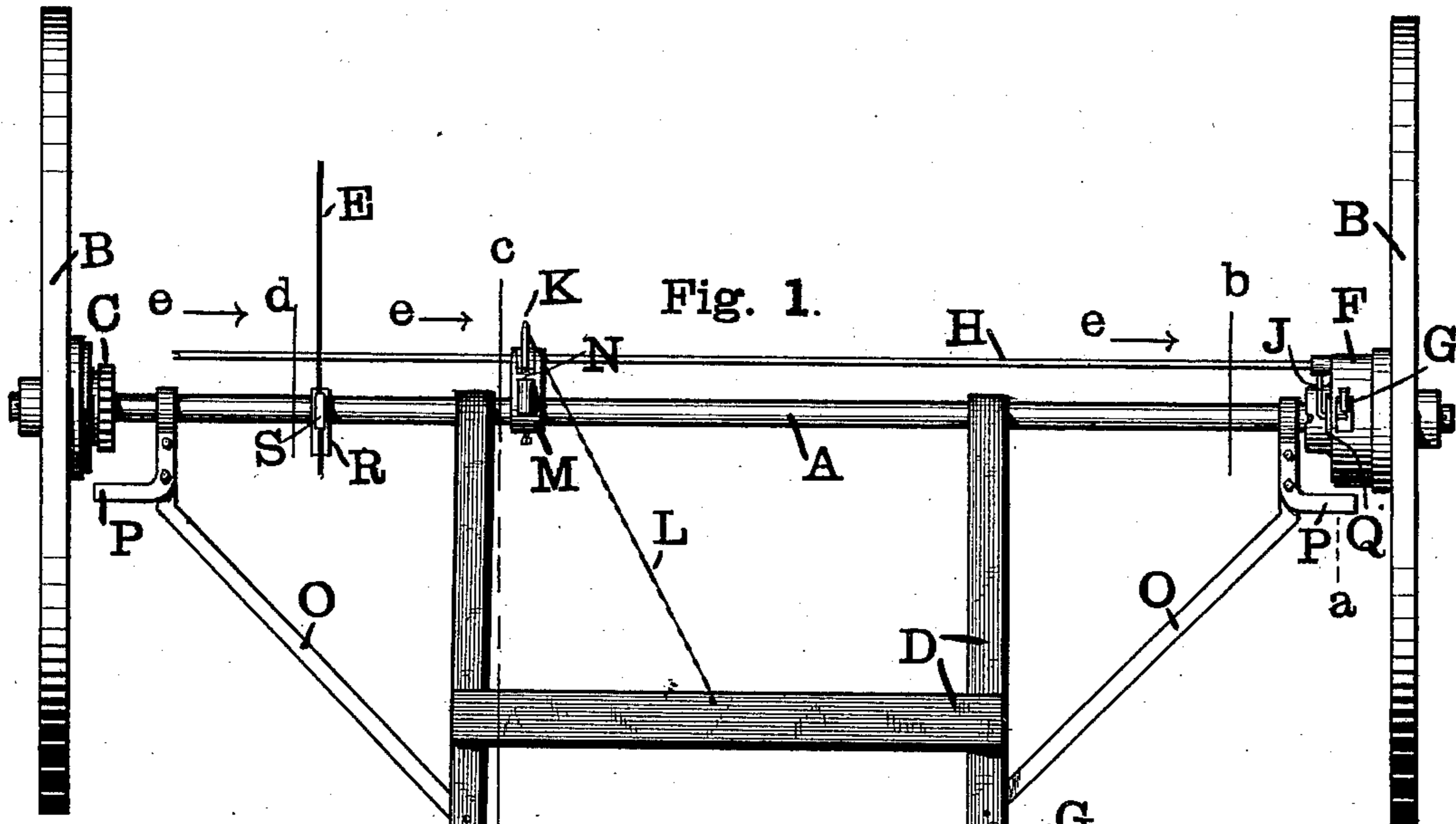


Fig. 4.

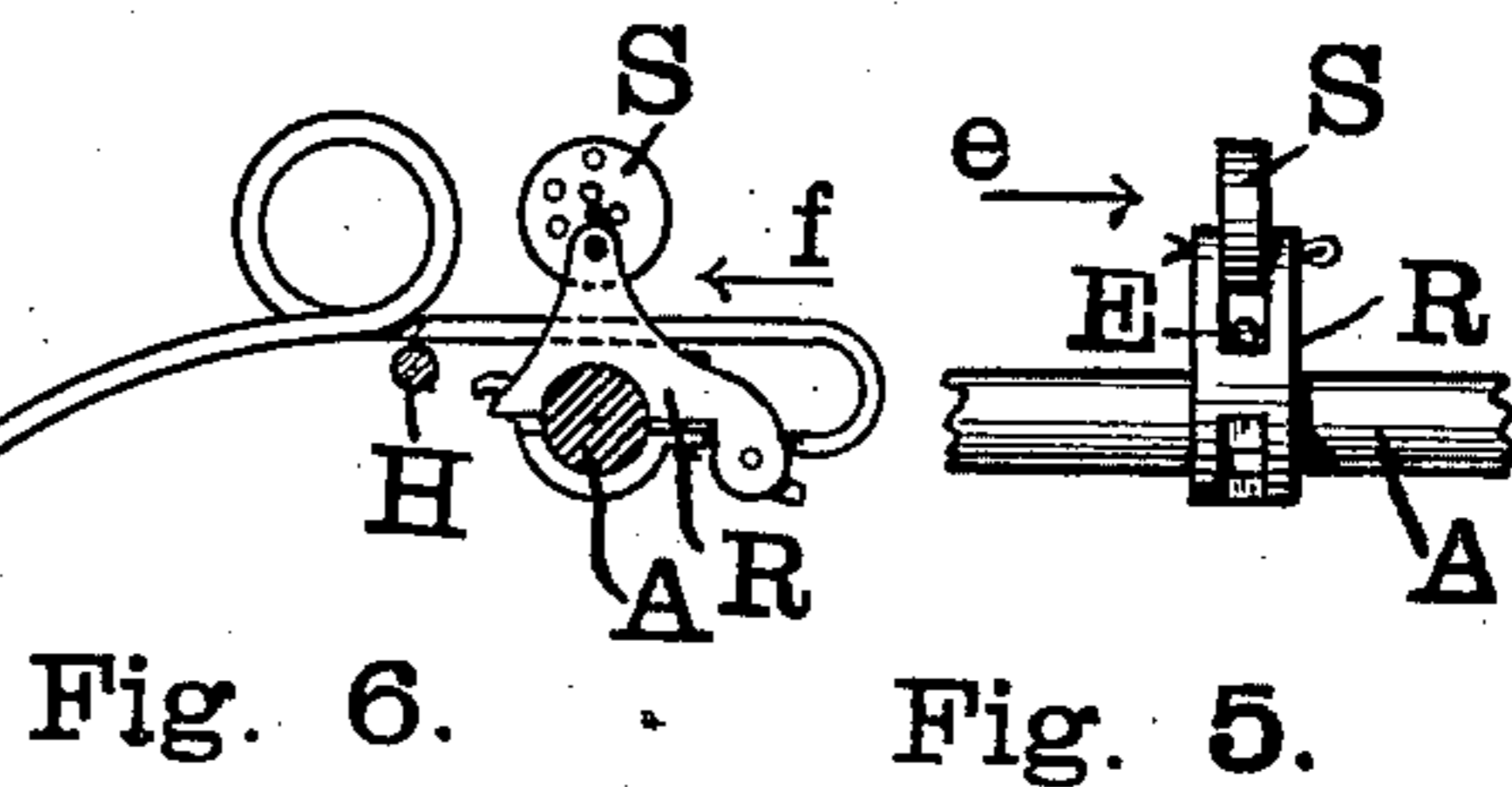


Fig. 5.

Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## HORSE HAY-RAKE.

SPECIFICATION forming part of Letters Patent No. 343,692, dated June 15, 1886.

Application filed August 31, 1885. Serial No. 175,700. (No model.)

*To all whom it may concern:*

Be it known that we, FREDERICK BENTEL and JOHN T. GARDNER, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Horse Hay-Rakes, of which the following is a specification.

This invention relates to horse hay-rakes, and will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a plan of a horse hay-rake illustrating our improvements, the driver's seat, all of the teeth, except one, and the pawl-case at one end of the axle, being omitted; Fig. 2, an inside face view of one of the pawl-cases, the axle and pawl-rod appearing in section as upon line *b*, and the pawl-stop appearing in section as upon line *a*; Fig. 3, a generally similar view of one of the pawl-cases, with a portion of its wall broken away to exhibit the interior; Fig. 4, a transverse section of the axle, &c., as at line *c*, showing the arrangement of the pawl-rod lever; Fig. 5, a front view of a portion of the axle, showing one tooth-holder in place, with a tooth shown in section; and Fig. 6, a transverse section of the axle, as at line *d*, exhibiting in side view one of the teeth with its holder.

The direction of view of Figs. 2, 3, 4, and 6 is indicated by the arrows *e* on Figs. 1 and 5. The direction of view of Fig. 5 is indicated by the arrow *f* in Fig. 6.

The different figures are drawn to varying scales.

In the drawings, A indicates the axle of the rake, forming also the rotatable rake-head; B, the wheels, fitted to revolve loosely upon the axles as usual; C, ratchet-wheels rigidly secured, one to the inside hub of each of the wheels, these ratchets revolving with the wheels; D, the usual shaft-frame, hinged at its rear end upon the axle, and intended to support the usual driver's seat, which is omitted in the drawings; E, one of the rake-teeth, of the form usually employed in this class of hay-rakes, with its heel attached to the axle, the axle being in practice provided with a full rank of these teeth, of which but a single one appears in the drawings; F, disk-like pawl-cases rigidly secured at each end of the axle against

the inside face of the wheels, the ratchets of the wheels being inclosed by the pawl-cases, and the outer ends of the pawl-cases being closed by the hubs of the wheels, which are in close contact with the pawl-cases; G, a hook-like pawl pivoted within each pawl-case, and having a tail extending outward through a mortise in the periphery of the pawl-cases, the hook of the pawl being adapted to engage the teeth of the ratchet; H, a rod disposed near to and parallel with the axle, and having its ends journaled in the inside walls of the pawl-cases, this rod being hereinafter denominated the "pawl-rod;" J J, bent lifting-levers secured, one on each end of the pawl-rod, the bent end of each lever entering through a slot in the wall of the pawl-case and engaging underneath the pawl therein in such manner that the oscillation of the pawl-rod will serve to permit the pawl to drop into engagement with its ratchet, or to lift it out of engagement with its ratchet; K, a pawl-rod lever secured to an intermediate portion of the pawl-rod; L, a slack-chain having one end made fast to the upper end of the pawl-rod lever, and having its other end made fast to a portion of the shaft-frame, the chain being in such position as to be easily reached by the driver's foot as the driver sits upon the usual seat; M, an intermediate bearing for the pawl-rod, the same consisting of a casting rigidly secured to the axle, and having a forked bearing for the pawl-rod, within which bearing the pawl-rod lever is disposed; N, a helical spring abutting within the casting and pressing backwardly against the lever, thus causing a pressure of the pawl-rod lever backward, whereby the lifting-levers J are held upward, thereby sustaining the pawls normally out of engagement with their ratchets; O, side braces from the shaft-frame, hinged to the axle near each wheel; P, pawl-stops bolted to these braces and presenting their ends near the periphery of the pawl-cases; Q, a latch pivoted to the inside face of one of the pawl-cases, and having a notch which will engage the lifting-lever when the lifting-lever is in its downward position, and having an end projecting beyond the periphery of the pawl-cases; R, a tooth-holder, of which

there is to be one for each rake-tooth, secured to the axle; and S, a disk provided with a spiral series of perforations held between jaws in the upper portion of the tooth-holder, the tooth having its heel pivoted to the tooth-holder and presenting a portion of its body below the disk. The tooth is at liberty to oscillate or "drop," as it is termed, a trifle, by reason of its pivoted connection to the tooth-holder, and by reason of the space between the lower portion of the disk and that portion of the tooth just below it. The disk is secured in the jaws of the tooth-holder by means of a split pin passing through the jaws and through one of the perforations of the disk. By the use of the proper one of the series of perforations in the disk almost any desired adjustment can be given to the drop of the tooth. It will thus be seen that, while the tooth may have a greater or less amount of drop, or none, if the central hole be the one used, the tooth will be raised into the dumping position, if the axle be rotated forwardly. We provide means for producing this forward rotation for dumping purposes by means of the draft; but in practice we also apply the ordinary hand-levers in connection with the axle, so as to constitute the rake a hand-dumper as well as a draft-dumper.

By analyzing Fig. 3 it will readily be seen that the ratchet-wheel, continuously revolving within the pawl-case, has normally no rotative effect upon the pawl-case, because the pawl is out of engagement with the ratchet, and is so held by the spring N. If, however, the driver places his foot upon the chain L, he will compress the spring, rotate the pawl-rod, depress the lifting-levers, and permit the pawls to drop into engagement with the revolving ratchets. So soon as the lifting-levers are depressed the latch Q drops and prevents the return of the lifting-levers. It being understood that the pawl-cases are fast upon the axle, it will now be understood that, under the circumstances just mentioned, the axle will be forced to revolve with the rake-wheels, and that the rake-teeth will thus be lifted and dump their load. The pawl-rod of course partakes of an orbital motion. This rotation of the axle should continue only long enough to properly dump the load from the rake-teeth, and consequently provision must be made for releasing it from the influence of the ratchets and allowing it to return to its normal raking position.

It is the office of the pawl-stops P to disengage the pawls from the ratchets at the proper time. This can be best understood in connection with Fig. 2, assuming the lifting-lever and latch to be down instead of up, as it is shown. As the pawl-case revolves forward, the latch will strike the pawl-stop and will unlatch and thus permit the lifting-levers to rise—that is,

in case the spring N is of sufficient strength to rotate the pawl-shaft and lift the pawls; but it is not desirable that this spring be of such power, as it would thereby be somewhat difficult to rotate the pawl-shaft by means of the foot-chain, the pawls requiring considerable force to lift them when in active engagement with the ratchet. The spring is therefore made with a view only to its holding the pawls normally out of engagement with the ratchet-wheels. The pawls become disengaged from the ratchet-wheels by striking against the pawl-stops. When this occurs, the axle is free to rotate backward and restore the teeth to raking position.

The rotation of the axle in the act of dumping will be effected by either wheel, according to which pawl happens to first engage the ratchet-wheel. In turning a corner it is obvious that the outside wheel, moving the faster, will be the one which will effect the axle. A latch upon a single pawl-case is sufficient, but it is better to have a latch upon each. The location of the latch near the pawl permits the latch to act upon the pawl without involving the torsional strength of pawl-rod. A positive engagement and disengagement of the pawl is thus secured, while the pawl-rod requires only sufficient torsional strength to support the weight of the pawl and latch.

We claim as our invention—

1. In a horse hay-rake, the combination of a tooth-holder, a rake-tooth pivoted thereto, and a disk provided with a spiral series of perforations and mounted in the tooth-holder, substantially as and for the purpose set forth.

2. In a horse hay-rake, an oscillating rake-head, a rank of teeth secured thereto, a rake-wheel fitted to revolve upon each end of the rake-head, a shaft-frame connected to the rake-head by hinge-bearings located at the ends of the rake-head near the inner sides of the rake-wheels, a ratchet-wheel fast upon a rake-wheel, a pawl supported at the end of the rake-head and adapted to engage the said ratchet-wheel, an oscillating rod disposed parallel to the rake-head, a lever by which said rod may be oscillated, a lifter secured to the end of said rod and engaging below said pawl, a spring to hold said rod in a position corresponding to the disengaged position of the pawl, a latch pivoted to the pawl-case and adapted to prevent the reaction of the lifter when depressed, and a stop secured to that portion of the shaft-frame located near said rake-wheel and adapted to be engaged by said latch and pawl, combined substantially as and for the purpose set forth.

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