

(No Model.)

2 Sheets—Sheet 1.

H. E. PRIDMORE.
HARVESTER.

No. 504,089.

Patented Aug. 29, 1893.

Fig. 1.

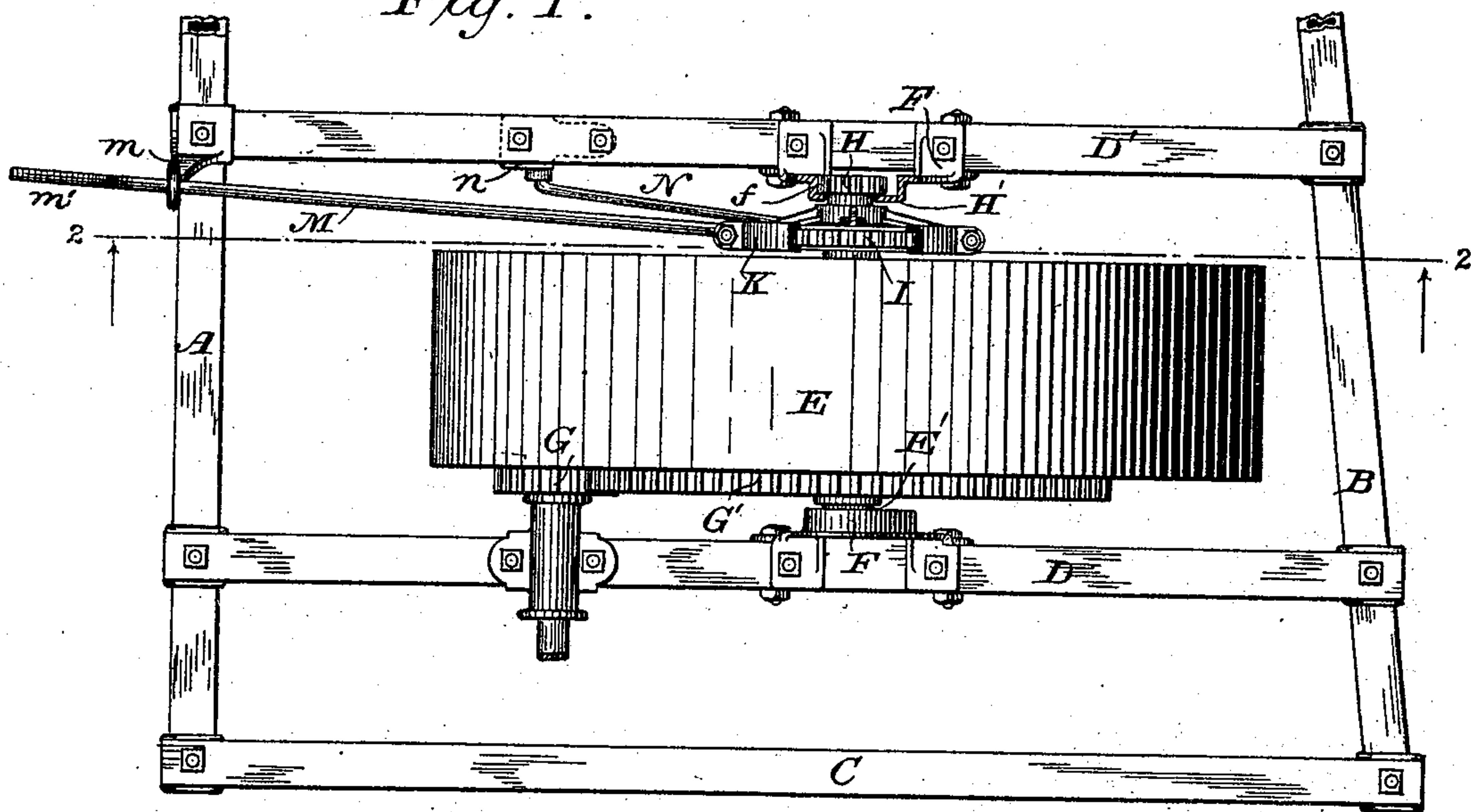
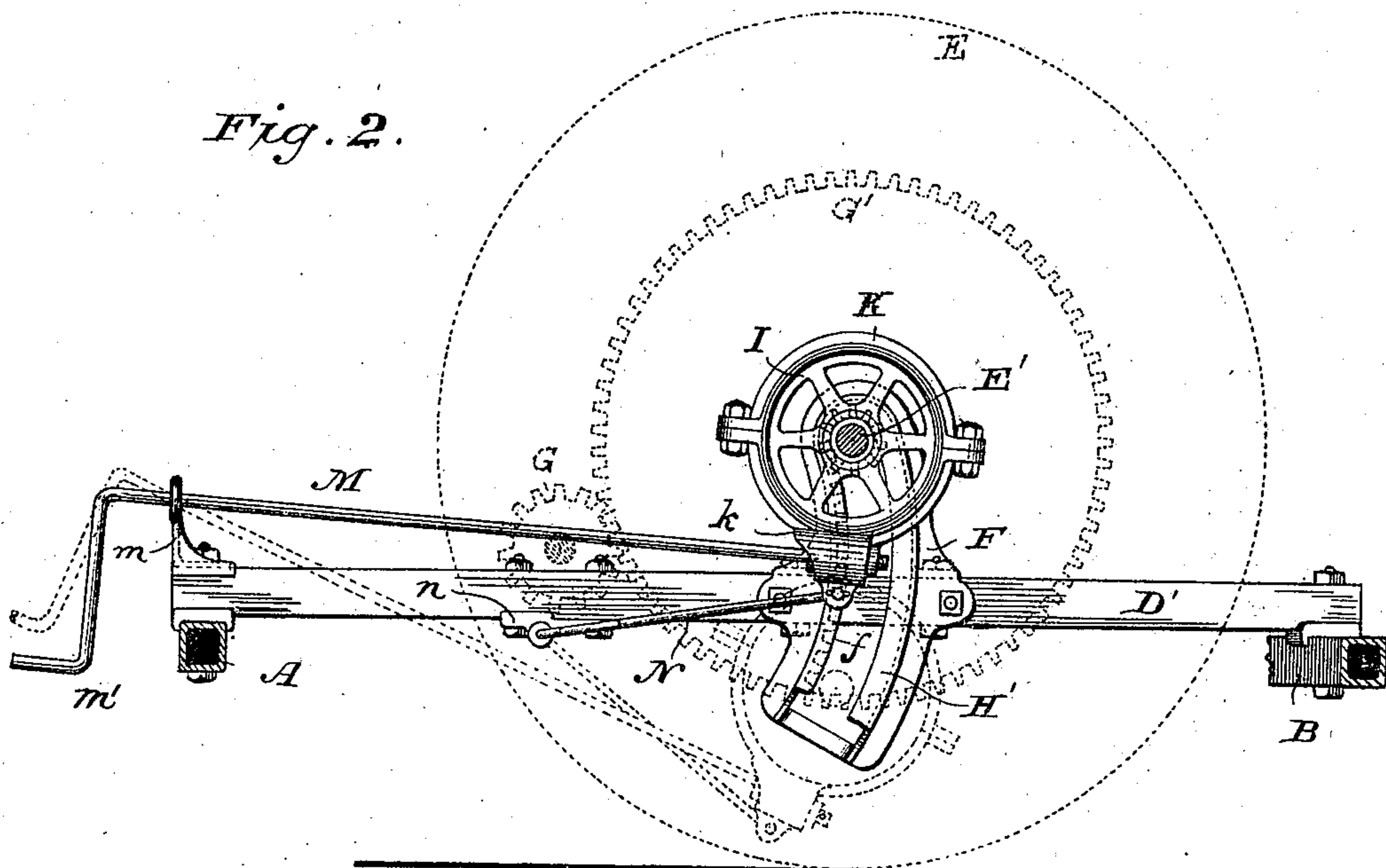


Fig. 2.



Witnesses

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Fig. 3.

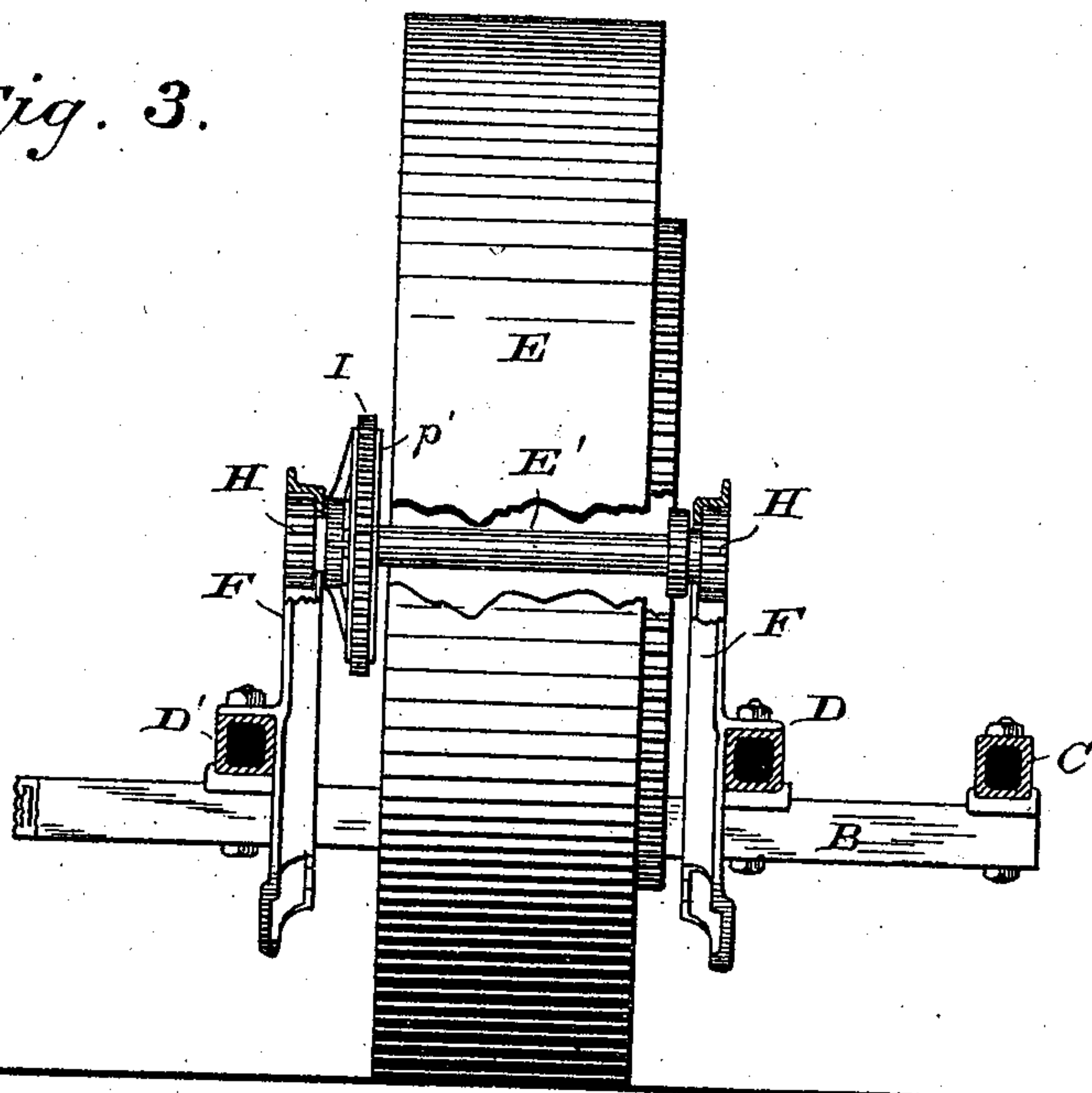


Fig. 4.

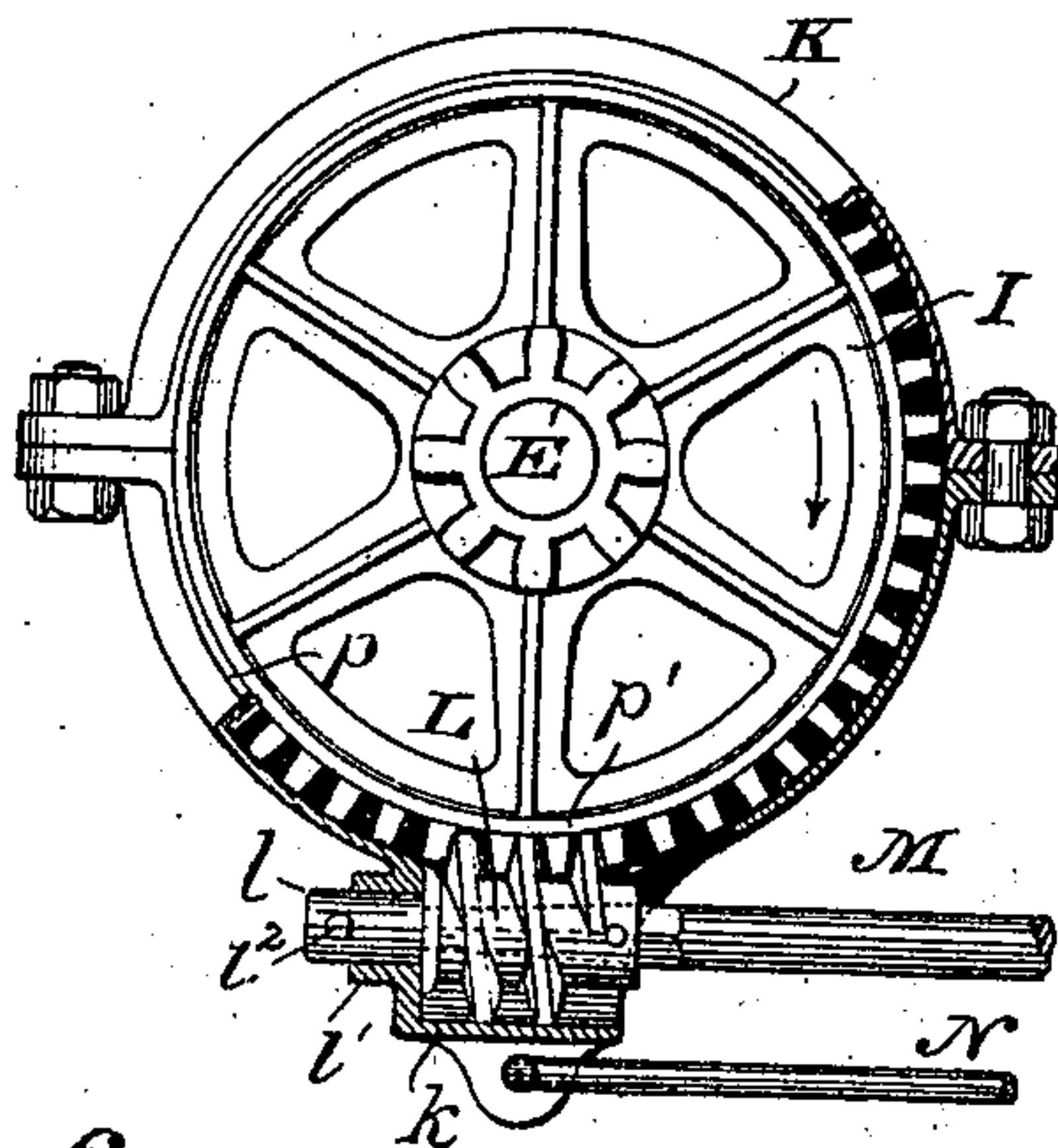


Fig. 5.

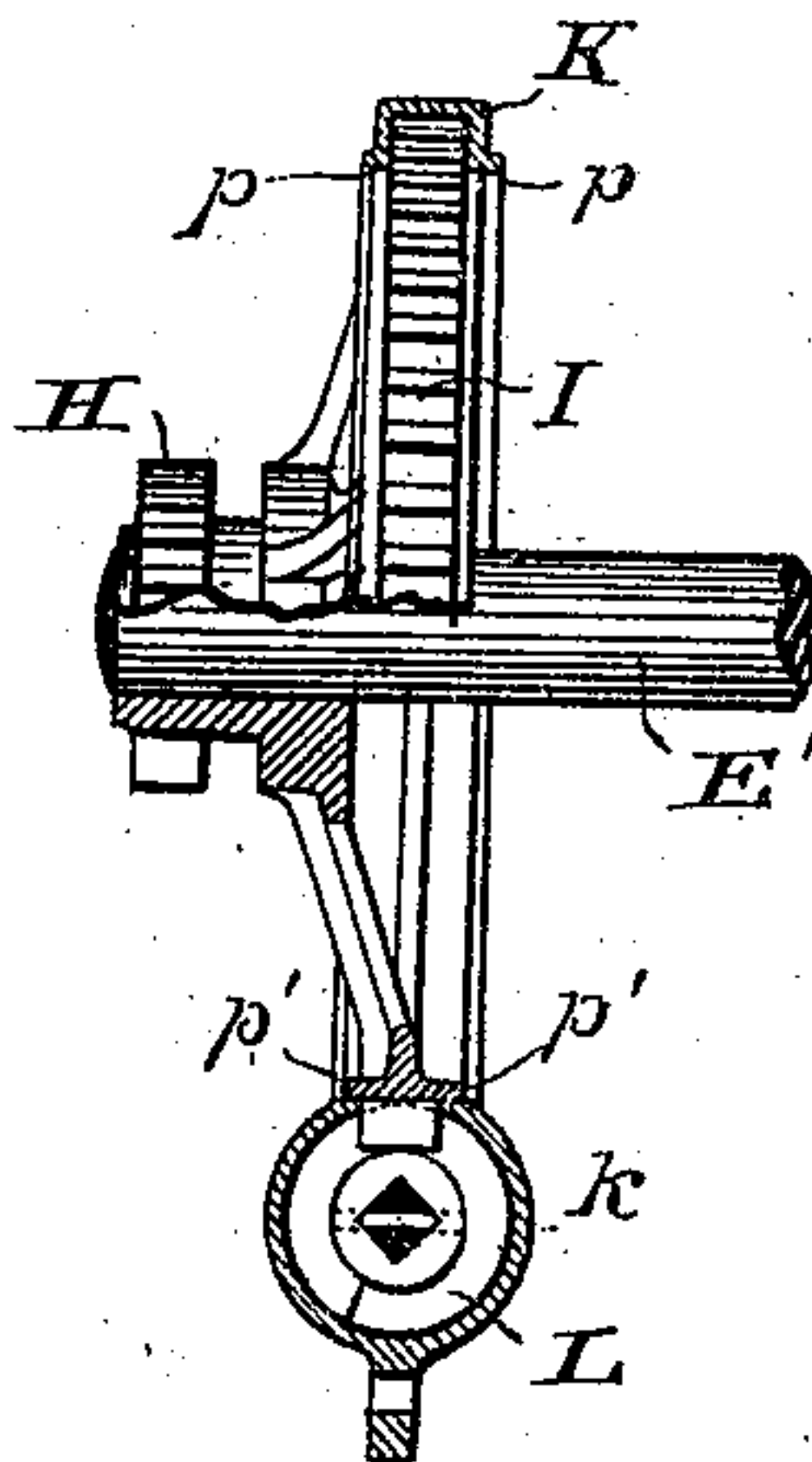
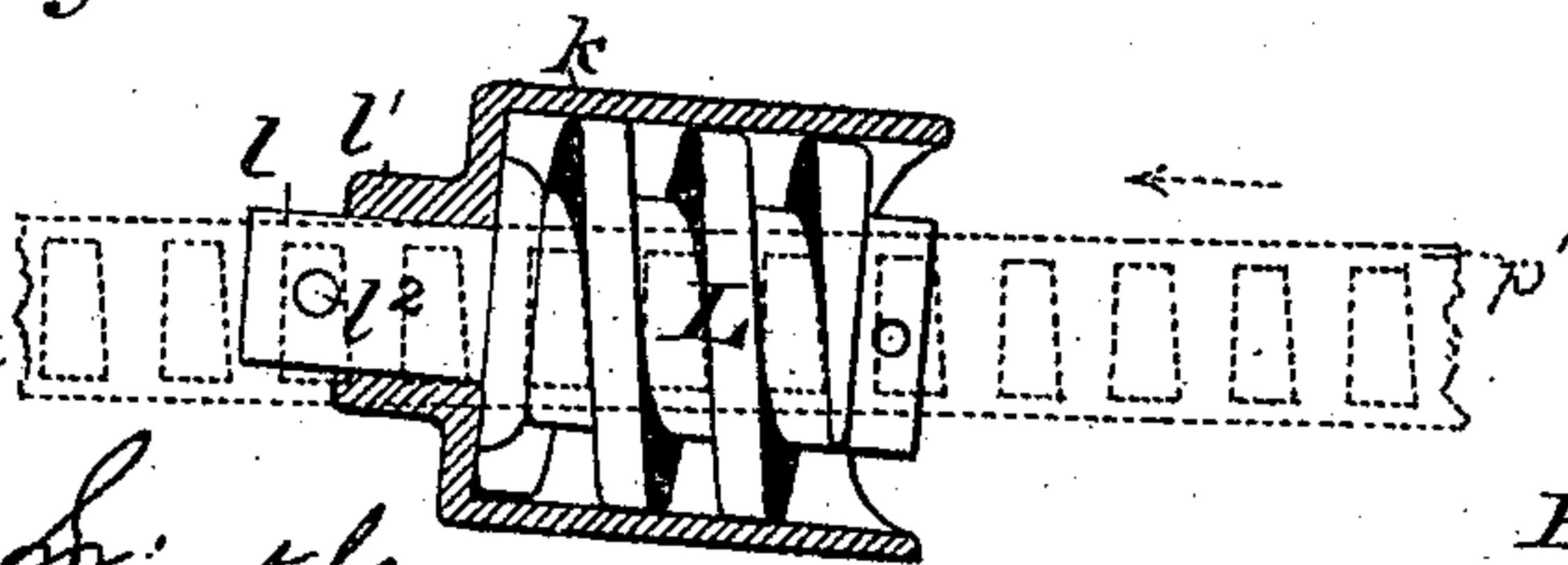


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY E. PRIDMORE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE McCORMICK HARVESTING MACHINE COMPANY, OF SAME PLACE.

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 504,089, dated August 29, 1893.

Application filed January 14, 1888. Serial No. 260,704. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. PRIDMORE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Harvesters, of which the following is a specification.

This invention relates to means for adjusting the main-wheel of harvesters relatively to the main-frame. Heretofore, among other devices for adjusting the main-wheel, a worm-shaft has been employed meshing with a worm-wheel upon the axle of the main-wheel, which, by means of pinions fast to its ends, engaged with segment-racks upon the frame, whereby the revolution of the worm-shaft would cause the main-axle to travel up and down along these racks.

The present improvement consists in the employment with the worm-wheel fixed to the axle, of a worm meshing with said wheel and ultimately supported by the axle with freedom to oscillate thereabout, a worm-shaft having its bearing in a loose eye on the frame, and a stiff connection between the worm-support and a pivotal point upon the frame, under such arrangement that the worm is oscillated about the axle to preserve its alignment with the bearing of the worm-shaft as the axle is adjusted; in supporting the worm in a housing formed upon a cap or casing encircling the periphery of the worm-wheel and connecting said housing with the main-frame in such a manner that the axis of the worm will be kept in line with the guide-eye through which the worm-shaft passes and that it may be prevented from revolution when the shaft is withdrawn from the worm or may be better steadied when the shaft is in position; and in such further combinations and details of construction as are hereinafter described and claimed.

In the drawings: Figure 1 is a top-plan view of so much of the stubble end of a harvester embodying my invention as is necessary to an understanding thereof, part being broken away to more clearly expose the construction. Fig. 2 is a vertical, longitudinal section on the line 2—2 of Fig. 1 with the main-wheel, main gear and prime pinion indicated in dotted lines; Fig. 3, a rear elevation partly in

section, and with the main-wheel, rack-standards or bridle-pieces, and the cap to the worm-wheel broken away or removed, and with the worm-shaft and worm omitted; Fig. 4, an enlarged detail view in side elevation of the worm-wheel and worm and accessory parts; Fig. 5, a like detail view seen from the rear, and also partly broken away or sectioned, and Fig. 6, a diagrammatic view on a still further enlarged scale to show the construction of the worm and its housing and of the worm-wheel, and their relations to each other.

A represents the rear sill, and B the front sill, of that portion of the harvester-frame located beneath the elevator.

C is the stubble-girt, which in some harvesters will be next to the main-wheel; D the outer girt, and D' the inner girt or lateral bars of the wheel-frame; and E is the main-wheel mounted loosely as usual upon an axle, E', extending between said lateral bars. To each girt of the wheel-frame is secured a standard or bridle-piece, F, having a rack, f, described on an arc concentric with the prime-pinion, G, driven by means of the main-gear, G', secured to the master-wheel, and to each end of the main-axle pinions, H, are made fast, to turn therewith, or impart motion thereto if themselves turned, these pinions meshing with the racks in the segment-standards and held in engagement therewith by the usual guards, H', as customary in this type of adjusting devices, so that by traveling up and down along the racks they may adjust the axle therealong co-ordinately at each end.

Near one end of the axle, preferably the inner end, between the adjusting pinion and the master-wheel, it receives a worm-gear, I, keyed or pinned, that it may turn the axle and turn therewith, and in close proximity to the periphery of this gear a cylindrical housing, k, opening on the side adjacent to the teeth of the gear is supported in such manner that it may be oscillated about the axle independently of the curve of the bridle-pieces. For instance the periphery of the gear is encircled by an annular cap or casing, K, advisably made in sections bolted together as shown, and carrying said housing at the lower side, but not necessarily so. This

housing is of such diameter as to receive a worm, L, the fin or thread of which bears upon and is steadied by the walls of the housing, and the body of which may be prolonged into a journal, l , entering a bearing, l' , in the front end of said housing and confined against withdrawal by means of a pin, l^2 , passed through its outer or projecting end.

At that side of the housing which opens toward the periphery of the worm-gear the thread of the worm is admitted to mesh with the teeth of said gear, thereby turning it, whenever the worm itself is turned. The rear end of the housing is of course open to receive the shaft, M, by which the worm is turned, and thereby the gear and the axle, to adjust the latter up or down along the racks. Instead, however, of permanently securing the shaft to the worm, as heretofore, the latter is made separate and is contained entirely or almost so within the housing, and at its rear end has a square or polygonal socket which receives the square or polygonal forward end of the shaft. Thence the shaft runs rearwardly and passes through a loose eye in a bracket, m , secured to the rear sill or to other suitable part of the frame-work, and behind that has a crank, m' , whereby it may be turned. Thus the shaft may be entirely detached from the worm and stowed away whenever not needed for adjusting the master-wheel, but can be readily inserted through the eye and into its socket in the worm and turned to rotate the latter whenever it is desired to change the height of the harvester, the binding contact between the teeth of the worm-gear and the thread of the worm being sufficient of itself to lock the two against accidental interrotation at other times. It is evident, however, that whenever the shaft is removed from the worm, the latter with its housing and the cap which encircles the gear and supports this housing will tend to revolve with the gear around the axis of the main-axle, and that there must be some agency to prevent such revolution if the adjustment is to be preserved, or the worm-shaft prevented from bending or breaking under the strain which it would have to meet from the downward thrust of the superimposed machine which tends to revolve the axle and worm-wheel and carry the worm and housing around the axis of said axle, and that this agency must be such also as to maintain the axis of the worm in line with the eye through which its shaft passes, at every point along the range of adjustment. Otherwise the outer end of the shaft will be thrown up or depressed as said axis varies from such line, and therefore must move in a vertically elongated guide, instead of a snugly fitting guide-eye as shown. Obviously the premises involve that the axis of the worm shall constantly change its angle relative to the curve of the segment standards, or so called bridle-pieces, and conform with radii drawn from the axis of the guide-eye through which the worm-shaft plays, instead of with radii from

the center upon which said curve is described. To this end I provide a stiff connection between the casing or housing support and a fixed point on the main-frame, such point being determined by the resultant motion which it is necessary to produce and depending partly upon the point at which the connection is applied to the housing and its support.

In that form of the invention chosen for illustration herein, and which is the best form at present known to me, the housing, or the cap of which it forms a part, is connected by means of a stiff rod, link or bar, N, with a pivotal bearing afforded by a bracket, n , upon the main-frame, so that this bar, as it hinges on said bearing to accommodate itself to the up and down adjustment of the axle, may hold the housing and its supports positively against revolving with the gear whenever the worm-shaft is removed, and keep the axis of the worm in line with the axis of the worm-shaft in all its up and down adjustments, and form a stay for the worm, that the latter, when at rest, may hold the worm-wheel from revolving and changing adjustment. This link or bar is not pivoted in line with the axis of the prime pinion-shaft, but is, as shown, pivoted to the harvester-frame at a point eccentric to the prime-pinion-shaft, and connected with the housing or casing at the most convenient point for its object, which point will be determined by the length of the bar. In the special form shown, the connection with the housing is a pivotal connection, so that in the up and down adjustments of the axle the rod or bar may pull the casing and worm-wheel around toward its own axis, or, as it were, push it relatively away, forming with it a sort of knee-joint which obviously lengthens and shortens with the adjustments, more or less, depending on the length of the bar and the point of its attachment to the main frame; the pull or draft of the bar against the rotative tendency imparted by the weight of the machine always keeping the worm-socket in the casing in line with the worm-shaft whatever the adjustment.

Instead of mounting the worm with its axis in the plane of the worm-gear, as customary heretofore, this worm, and consequently its housing, is herein mounted with its axis slightly oblique to the plane of the gear, as shown in Fig. 6, so that it may bind better with the gear when left to itself, this advantage being obtained by the position of its thread which is brought more nearly at right angles with the plane of the gear; in other words if the worm has a right-hand thread it is brought to such inclination that its axis crosses the plane of the worm-wheel from left to right, and if it has a left-hand thread the axis will be made to cross the plane of the worm-wheel from right to left; thus while the thread may have a very rapid pitch it is brought by the inclination of its axis into such relation with the wheel that it acts as if with a very slow pitch. A further advantage is, that the teeth

of the worm-gear may be beveled as indicated in the just mentioned figure, toward one side only thus enabling the gear to be cast and readily drawn from the mold, and mounted for engagement with the worm without any dressing down or reshaping. As a consequence of the obliquity of the worm its actuating shaft will also have an oblique trend away from the wheel and toward the adjacent girth of the wheel-frame.

Casings or caps embracing the worm-wheel and supporting the adjacent end of the worm-shaft have been employed heretofore, but have invariably rested on and been supported by the crests of the gear-teeth, involving greater friction and greater liability of clogging. To avoid this I form the cap or casing with inseting annular shoulders, *p*, one on each side, and construct the worm-gear with annular seats, *p'*, at each side of the teeth, upon which these shoulders rest and from which they support the entire casing without other contact. The shoulders and seats may readily be turned smooth and true and friction therefore reduced to a minimum.

I do not intend to claim herein broadly the employment of a worm-gear upon a main axle, and a worm meshing therewith and connected with supports upon the harvester as a means for adjusting said axle, knowing that this in itself is old. But

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

1. The combination, substantially as herebefore set forth, of the master-wheel and its axle, the pinions, the segment rack-standards, the worm-wheel fixed to said axle, a worm meshing with said wheel and ultimately supported by the axle with freedom to oscillate thereabout, a stiff rod or shaft for turning said worm, a loose eye on the frame in which said rod has its bearing, and a draw connection between the worm-support and a pivotal point upon the frame, the parts being so arranged and proportioned that the worm is oscillated about the axle to preserve its alignment with the bearing of the shaft.

2. The combination, substantially as herebefore set forth, of the master-wheel and its axle, the pinions upon the end of said axle, the segment rack standards with which said pinions engage, the worm-wheel fixed to said axle, a worm meshing with said wheel, a housing for said worm, a stiff rod or shaft pivoting in a guide-eye or bearing and attached to said worm, whereby it may be rotated, and a stiff connection with a pivotal point on the main-frame, conforming said housing to the inclination of the worm-shaft and holding it against orbital movement whenever the shaft is at rest and maintaining the alignment of the worm with the bearing of the shaft, all be-

ing located and proportioned essentially as described.

3. The combination, substantially as herebefore set forth, with the axle, of the worm-gear, the casing encircling the periphery of said gear, the worm carried in a housing from said casing and meshing with the teeth of the gear, the detachable shaft whereby the worm is turned, the loose bearing upon the frame in which such shaft may oscillate, and the link connecting the casing with a fixed point upon the frame, all being so arranged and proportioned that the housing and casing are caused to oscillate during the up and down adjustments to preserve the axis of the worm in line with the worm-shaft and its bearing.

4. The combination, substantially as herebefore set forth, of the main axle, the worm-gear mounted thereon, a worm suspended from said axle and meshing with the gear, arranged with its axis oblique to the plane of the gear, a stiff shaft for revolving said worm, a bearing on the frame in which said shaft may oscillate, and a link pivoted both to the worm-support and to the main-frame to retain the axis of the worm in line with said bearing, all being arranged and located essentially as described.

5. The combination, substantially as herebefore set forth, of the main axle, the worm-gear thereon, the casing encircling said gear and having an oblique housing, the worm mounted in said housing with its axis oblique to the plane of the gear, the worm-shaft, the loose bearing for the latter on the main-frame and the link connecting said casing with the main-frame, and operating to oscillate it around the axis of the worm-gear in the up-and-down adjustment, to preserve the axis of the worm in line with the worm-shaft and its bearing, the parts being arranged and proportioned practically as described.

6. The combination, substantially as herebefore set forth, of the main axle, the worm-gear thereon, the casing encircling said gear, its housing and the worm therein, the detachable crank-shaft, the loose bearing therefor on the main-frame, and the link connecting the casing with the main-frame, to oscillate said casing, the parts being arranged and proportioned essentially in the manner described.

7. The combination, substantially as herebefore set forth, of the worm-gear, its annular seats, the casing with annular shoulders resting upon said seats, and the worm supported by said casing in mesh with the gear.

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Witnesses:

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