

(No Model.)

J. R. HICKS.
ROTARY HARROW.

No. 407,658.

Patented July 23, 1889.

Fig. 1.

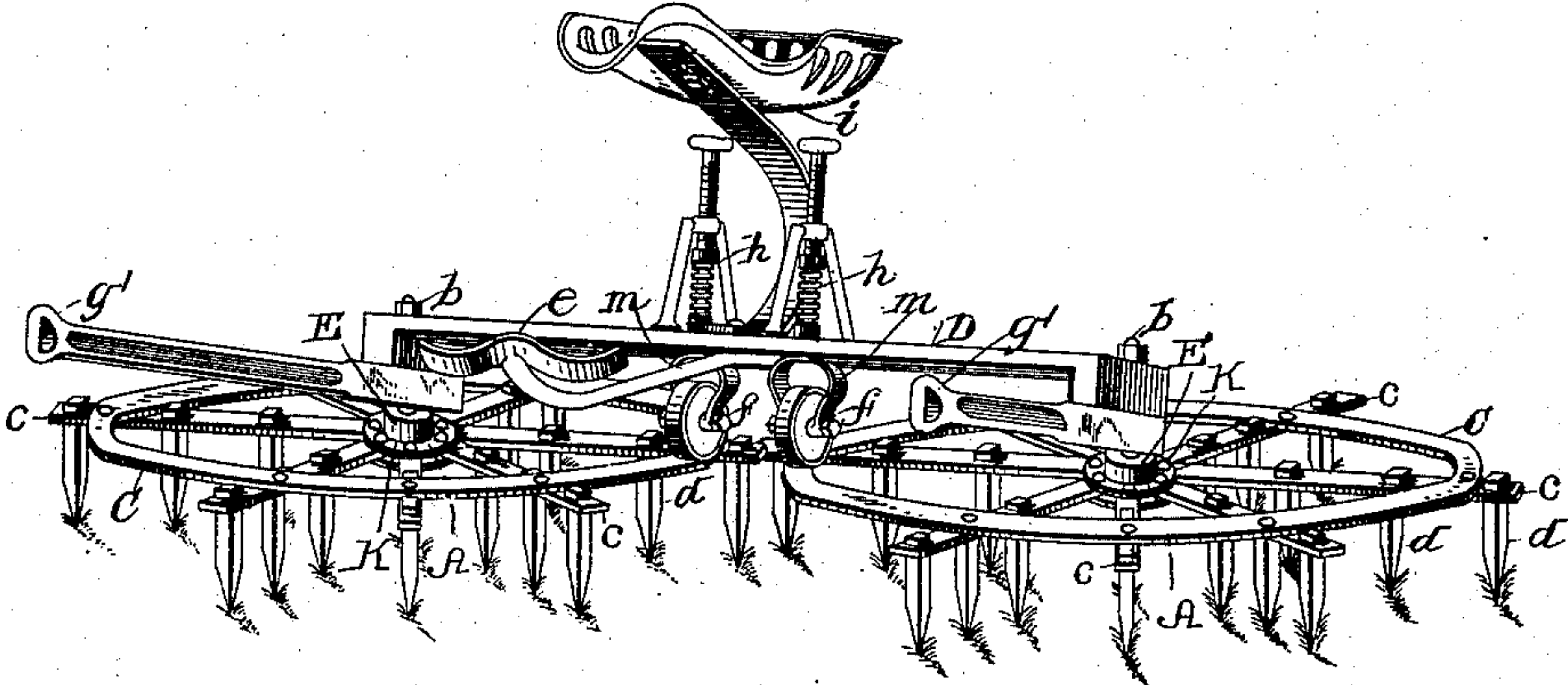


Fig. 2.

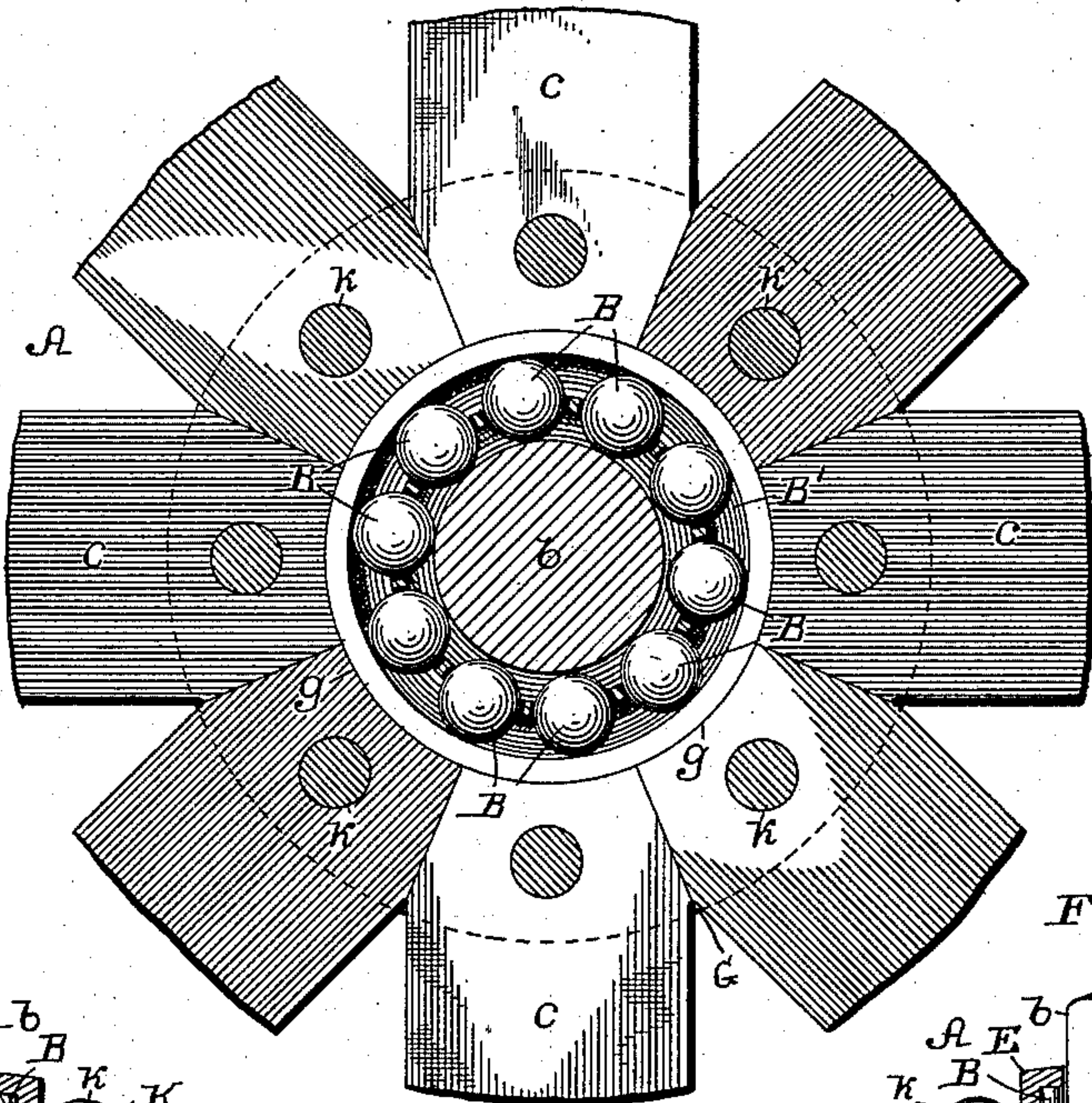


Fig. 4.

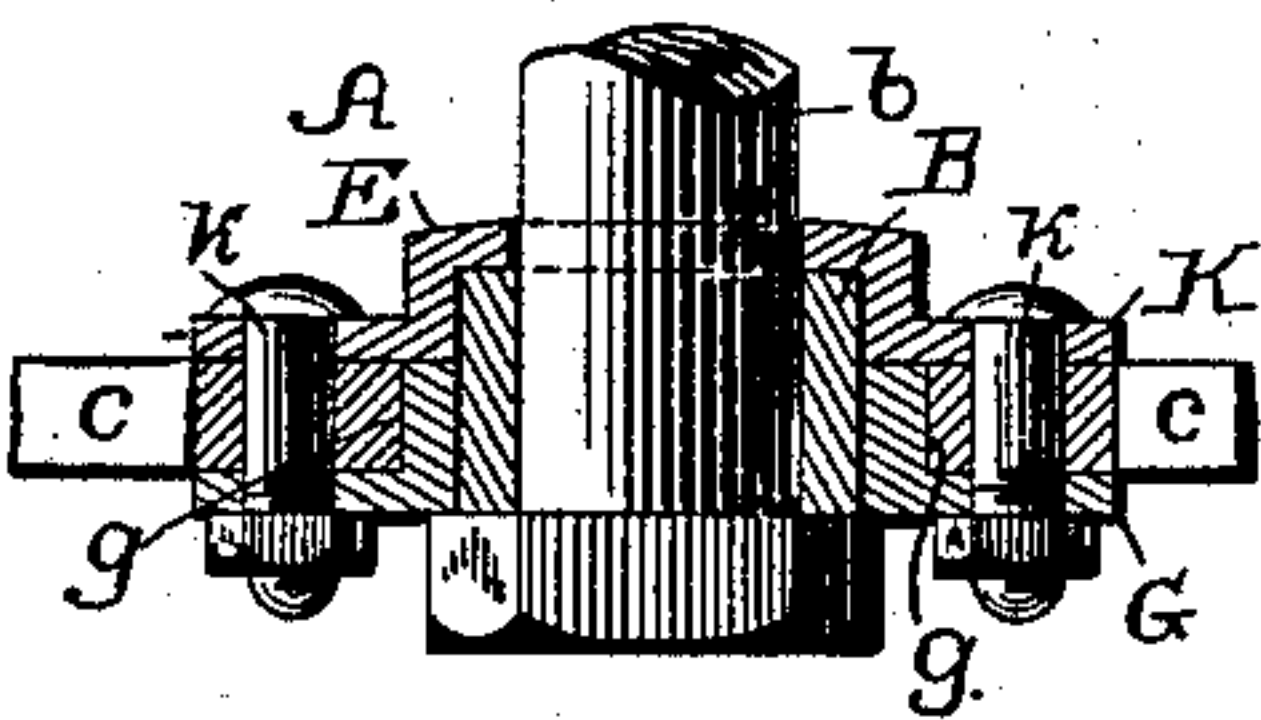


Fig. 5.

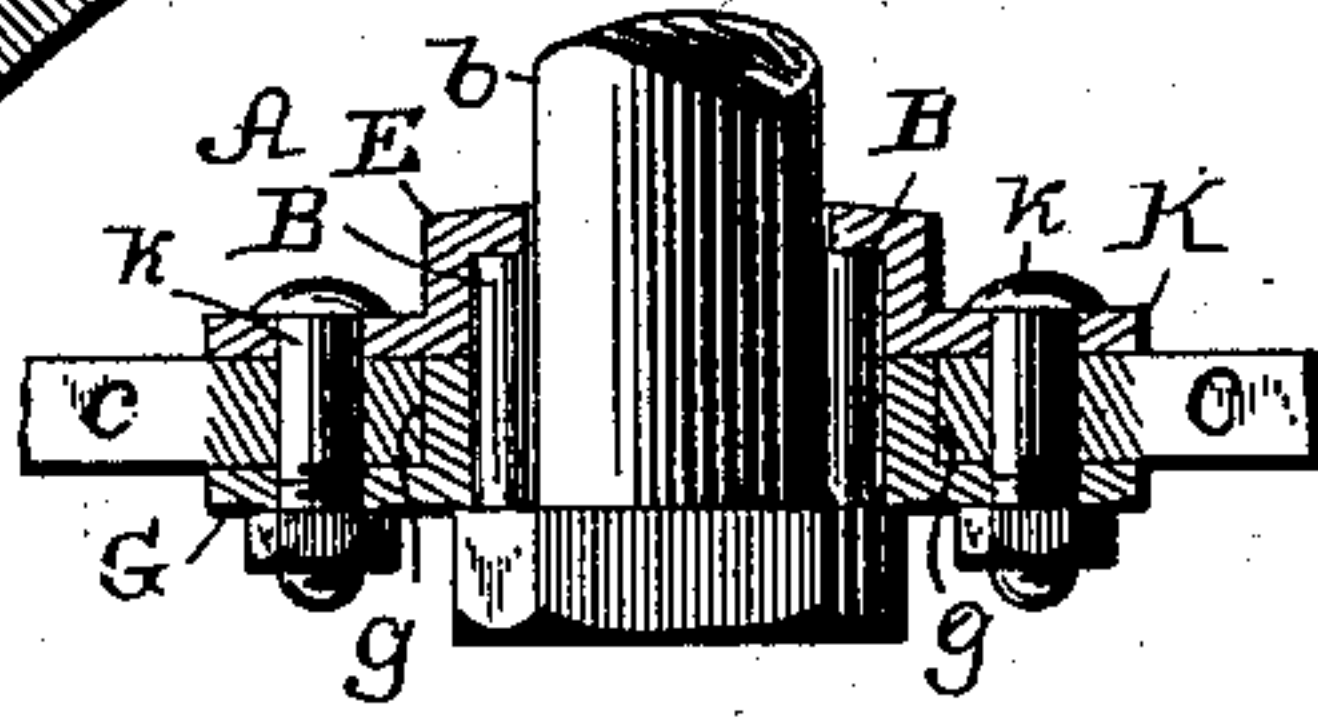
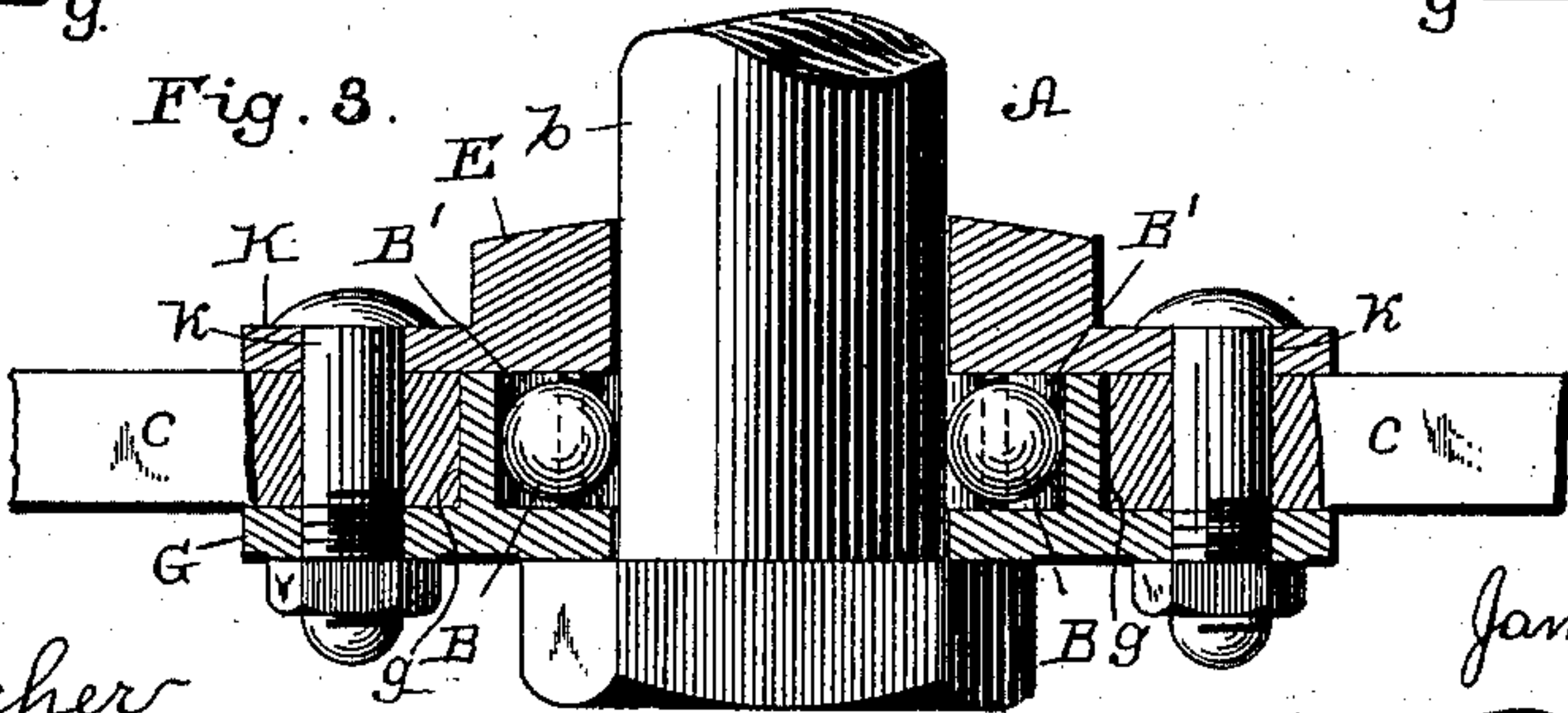


Fig. 3.



Witnesses

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JAMES R. HICKS, OF KANSAS CITY, MISSOURI.

ROTARY HARROW.

SPECIFICATION forming part of Letters Patent No. 407,658, dated July 23, 1889.

Application filed September 28, 1888. Serial No. 286,640. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. HICKS, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improve-
5 ments in Rotary Harrows, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to rotary harrows; and
10 it consists in the novel construction, combination, and arrangement of parts, hereinafter set forth, and pointed out in the claim.

Referring to the drawings, making a part
15 of this specification, Figure 1 is a perspective view of a harrow embodying my improvement. Fig. 2 represents a top plan view of the portion of a harrow-frame to which my improvement is applied, the preferred form
20 being shown. Fig. 3 is a side elevation of the central portion of a revolving harrow-frame, partly in section, illustrating the interior construction of the preferred form of anti-friction bearing. Figs. 4 and 5 are side
25 elevations of a modified form of the device, some portions being shown in section.

My present improvement in center bearings
for revolving harrows is adaptable to many forms of such an implement, either single,
30 duplex, or in connected series of revolving frames. The preferred form for its utilization is shown as embodying the salient features of my patent, No. 369,600, dated September 6, 1887. A brief description of the plan
35 of construction of this harrow will be given to render clear the operation of such parts as constitute the subject of my present invention, reference being specifically made to the annexed drawings, that have already been
40 mentioned.

The harrow shown complete in Fig. 1 consists, essentially, of two revoluble frames A,
45 and as the construction of these is similar a description of one will suffice for both.

The frames are preferably made circular,
45 and for the purpose of saving material are each composed of a flat ring C, that is superimposed upon the arms *c*, which radiate from a central hub-plate G. (See Fig. 3 for an enlarged view of the parts.) The hub-plate G
50 is a circular metallic disk having a central

perforation for the reception of the vertical
king-bolt *b*, and concentric therewith an integral vertical annular flange *g* is formed on
the top surface of the plate G. The space *B'*
intervening between the flange *g* and the
55 king-bolt *b* when the latter is in position is such as to permit the insertion of a series of true spherical balls *B*, that are preferably made of metal hard enough to withstand
60 wear. On the upper surface of the flange *g* a cap-plate *E* is mounted and secured by the bolts *k*, said bolts being inserted through proper-sized perforations made at spaced intervals in the cap-plate *E* and hub-plate *G* oppositely, the bolts corresponding in number
65 to that of the radial arms *c*, through which they are inserted and serve to hold in place.

As will be seen in Fig. 2, the radial arms *c*
have their inner ends mitered on the edges
70 to permit these edges to have bearing contact, and the series of arms to mutually brace and support each other laterally, the bolts *k* passing through each arm at a suitable distance from their inner ends, which ends abut
75 against the outer surface of the flange *g*, as shown.

In Figs. 4 and 5 there is a form of anti-friction bearing for the king-bolt shown, in
which rollers *B* are employed in lieu of the
80 balls previously described. These rollers occupy the annular channel *B'*, and are of such relative length and diameter that when the space is completely filled with the rollers the
king-bolt *b* will be afforded a rolling support
85 that is the equivalent of the ball-bearing shown in Figs. 2 and 3, the cap-plate *E* holding the rollers from vertical displacement in
like manner.

Each of the arms *c* is provided with a suitable number of depending teeth *d*, as shown
90 in Fig. 1.

In order to support the harrow-frames *C*
and adapt them to rotate and pulverize the
soil over which the harrow is drawn, the draft-
frame *D* is provided. This is mounted on
95 clevis-arms *g'*, that are secured to project forwardly from the ends of the frame and at right angles to the same. Both the clevis-arms *g'* and the draft-frame *D* are vertically
perforated to engage the king-bolts *b*, the nuts
100

on which bolts bear on the upper surface of the frame D to hold the parts intact and permit the harrow-frames A to rotate freely.

On the draft-frame D the driver's seat *i* is
5 mounted at about the center of said frame, and the bracket-frames, which support the vertical screws *h*, are affixed rigidly to the top face of said draft-frame on each side of the seat, so that the hand-wheels on the upper
10 ends of the screws *h* will be conveniently located to be manually operated by the driver when the harrow is in motion. The screws *h* terminate below the frame D in bifurcated ends *m*, which are adapted to support the
15 pressure-wheels *f* on journal-bolts inserted through perforations made in these forked portions of the screws *h*.

The purposes for which the pressure-wheels *f* are provided have been fully detailed in my
20 Patent No. 369,600, and as they do not constitute a necessary portion of my present invention, I will not further consider them. A foot-rest *e*, as will be seen in Fig. 1, is conveniently located in front of the driver's seat.
25 The arms *g'* are intended to receive clevis-links for the attachment of a pair of horses or other draft-animals, said arms extending a proper distance in advance of the rotating harrow-frames to avoid contact of the animals
30 therewith.

It is evident from the foregoing description of parts that the harrow-frames will rotate with greatly-diminished frictional resistance

at their center of motion, and that lubrication of the working parts where contact is had with
35 the king-bolts *b* may be dispensed with. From the great reduction in friction of the working parts an important saving in draft force is effected and the durability of the machine largely increased.
40

I am aware that anti-friction devices—such as balls and rollers—have been used in rotary harrows and in bearings of various kinds, and I do not desire to claim such an invention
45 broadly.

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

In a rotary harrow, the combination, with two similar harrow-frames A A, that are circular and each composed of a central hub-plate G, having upright flange *g*, cap-plate E, bolts *k*, and spaced arms *c*, of king-bolts *b*, located in central perforations of said plates G and E, and two sets of anti-friction rolling
50 devices that are loosely held between and in contact with the king-bolts and the upright flanges of said hub-plates, substantially as set forth.
55

In testimony whereof I affix my signature in
60 presence of two witnesses.

JAMES R. HICKS.

Witnesses:

F. G. FISCHER,
F. C. FARR.