

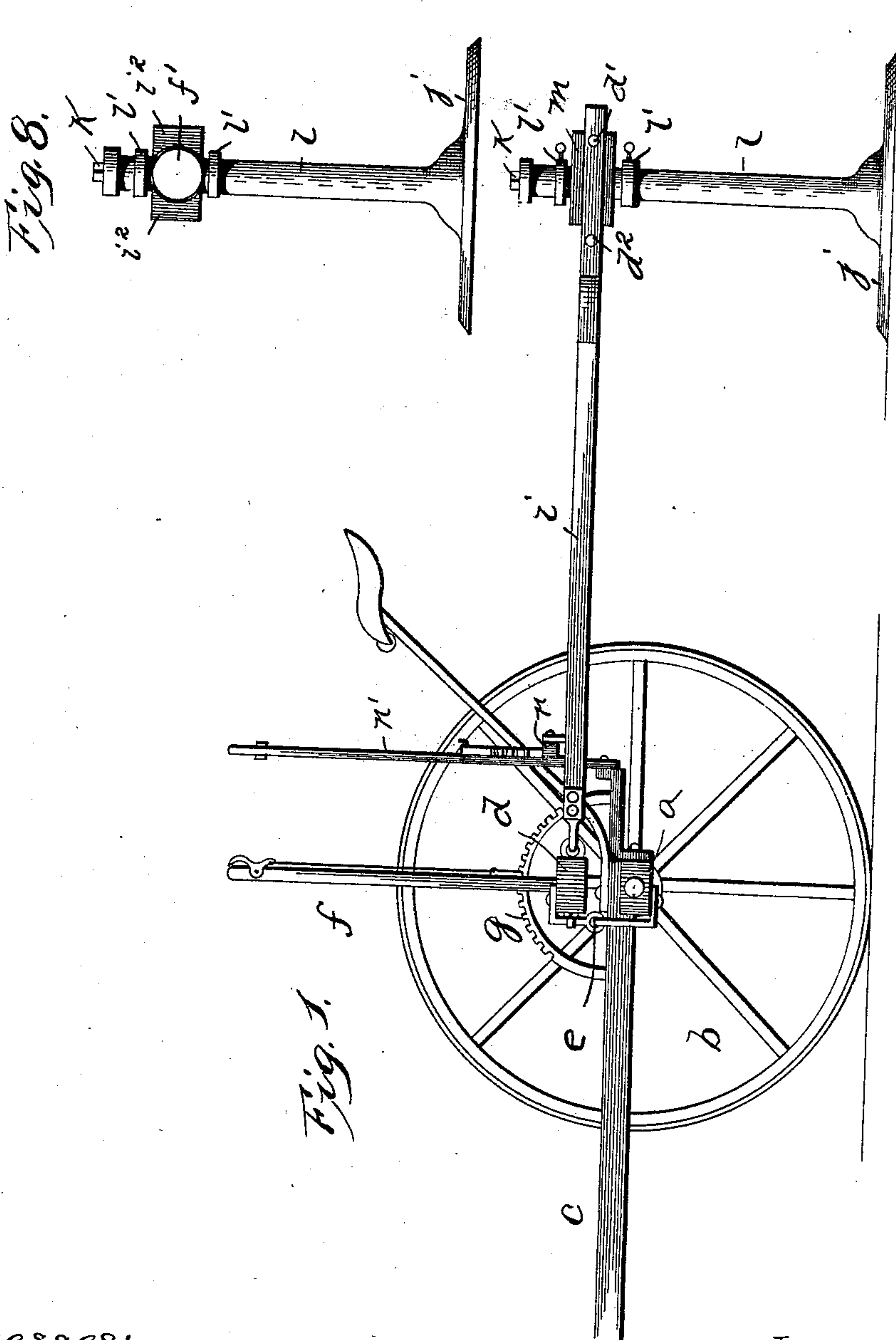
(No Model.)

3 Sheets—Sheet 1.

E. E. WHIPPLE.
HARROW.

No. 556,075

Patented Mar. 10, 1896.



Witnesses:
C. C. Duffy
Hubert Peck

Inventor:
E. E. Whipple
per *[Signature]*
Attorney

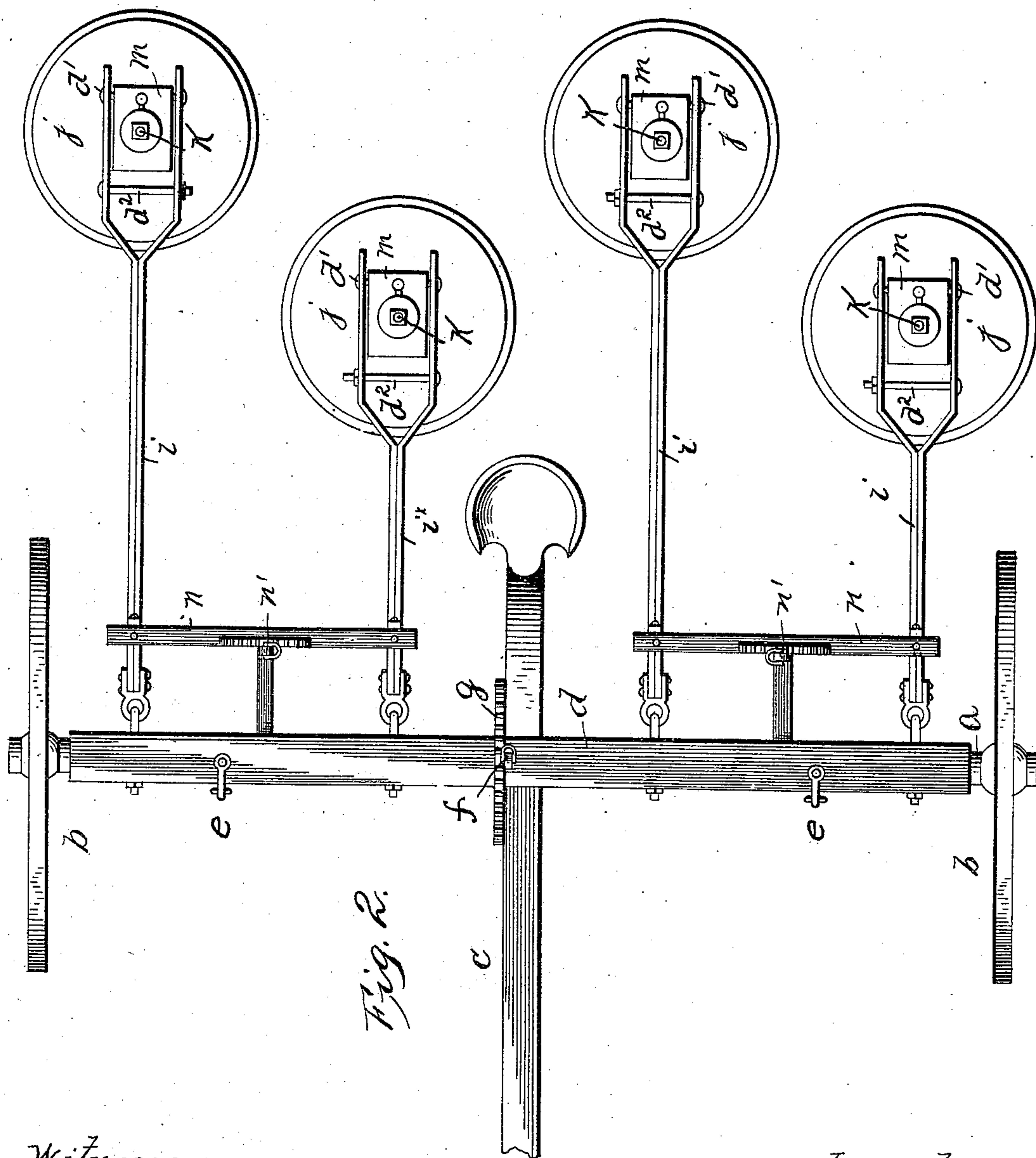
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E. E. WHIPPLE.
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3 Sheets—Sheet 2.

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Inventor:
E. E. Whipple
per *[Signature]*
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3 Sheets—Sheet 3.

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Fig. 3.

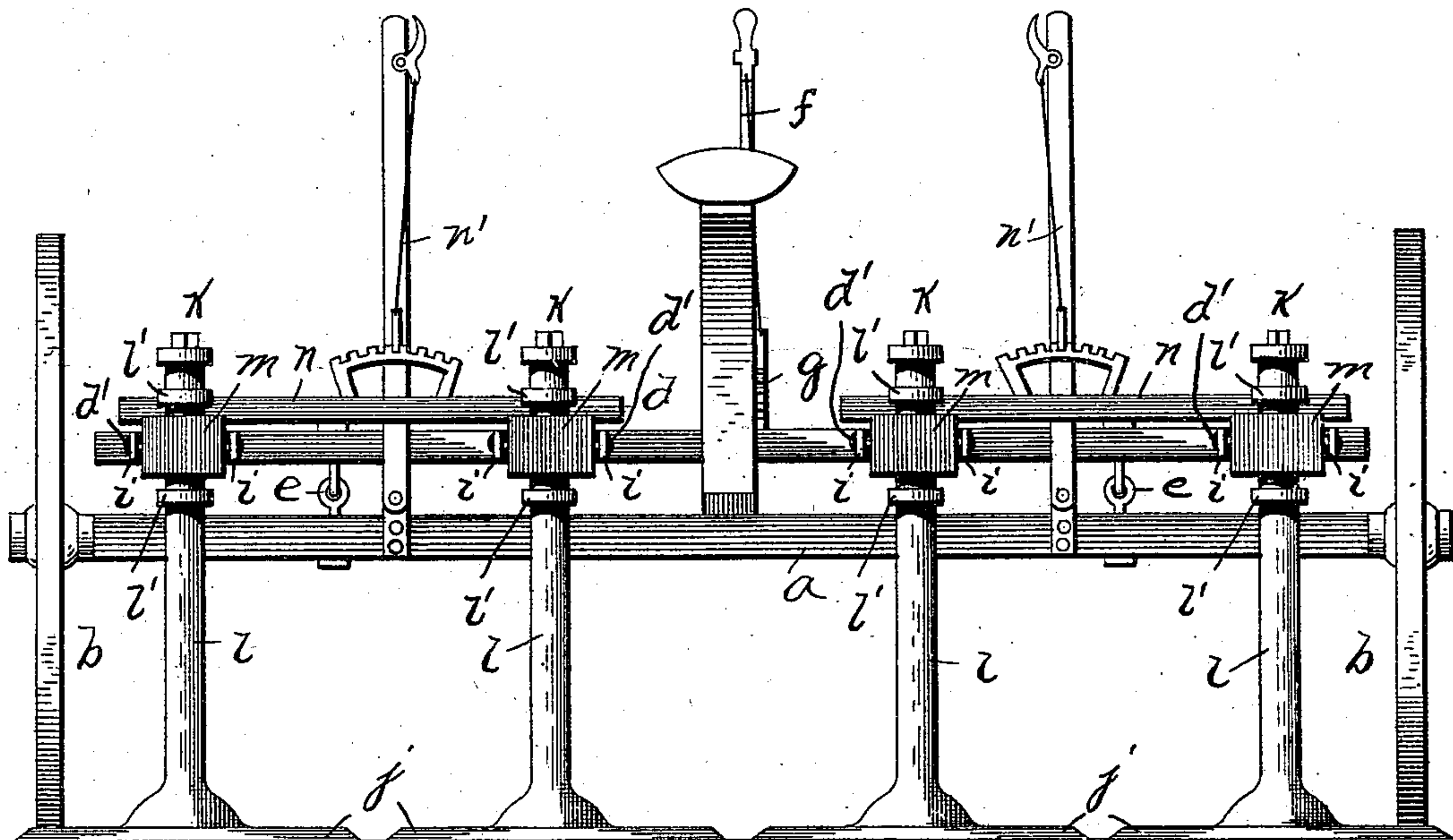


Fig. 5.

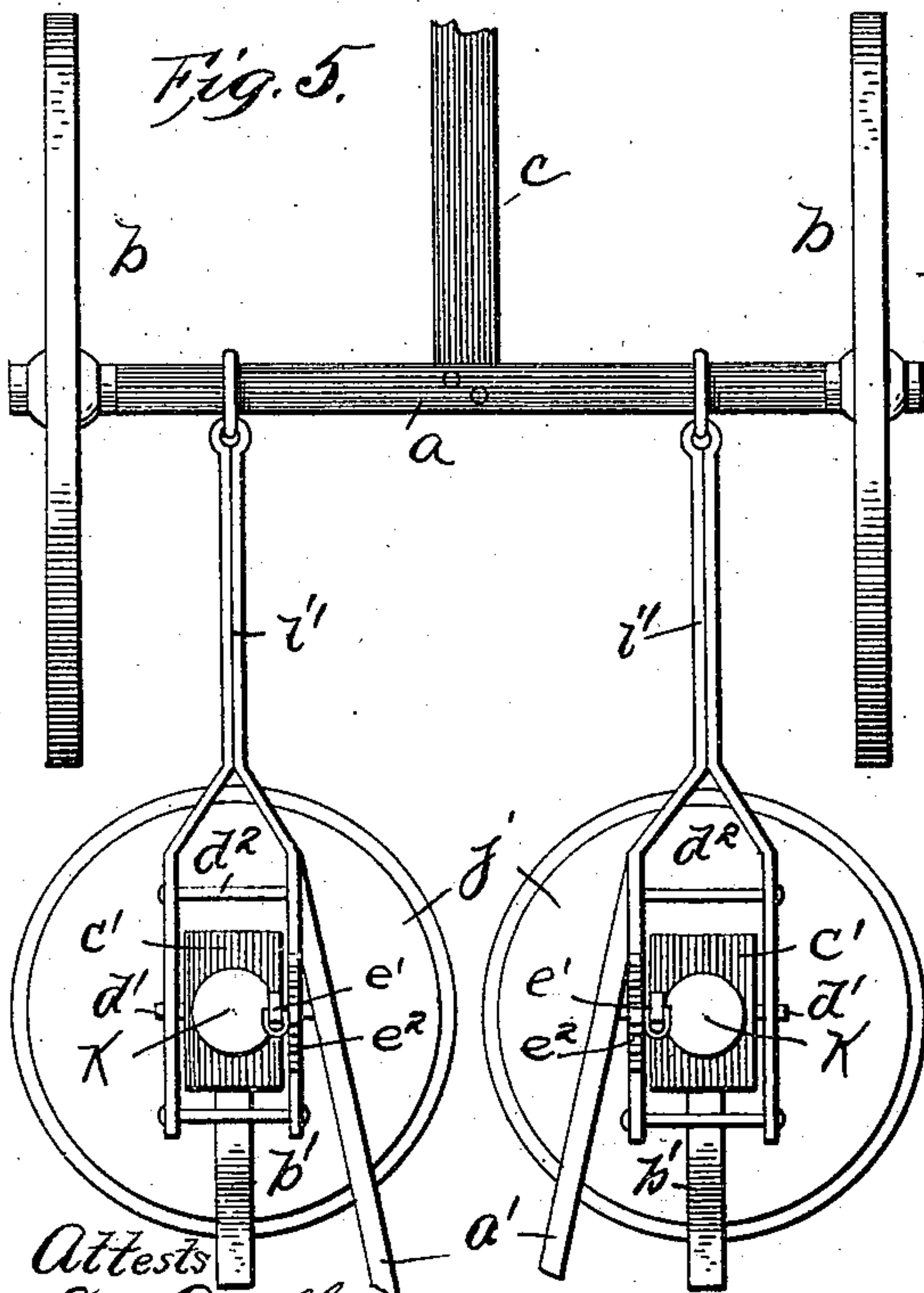


Fig. 4.

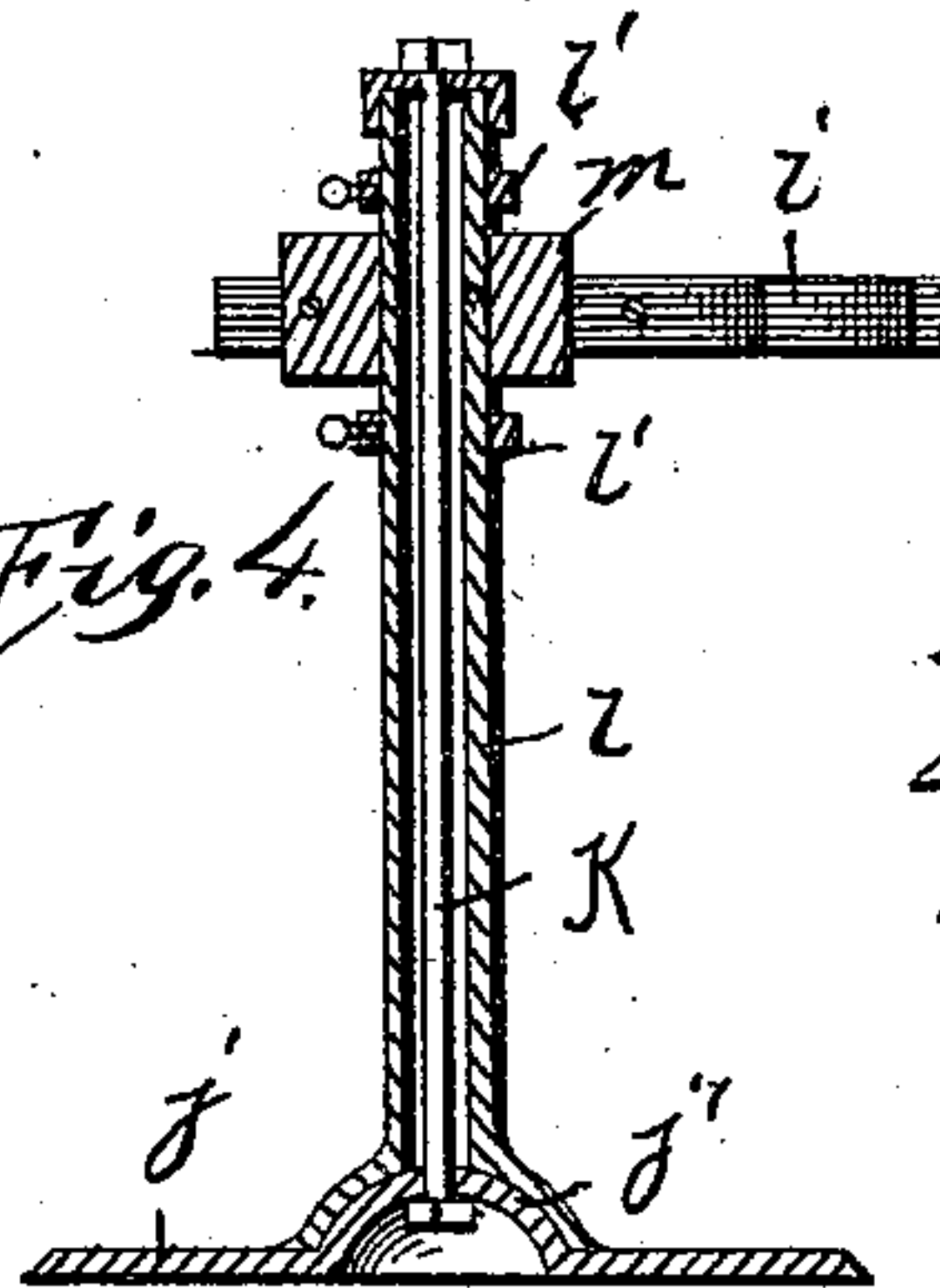


Fig. 7.

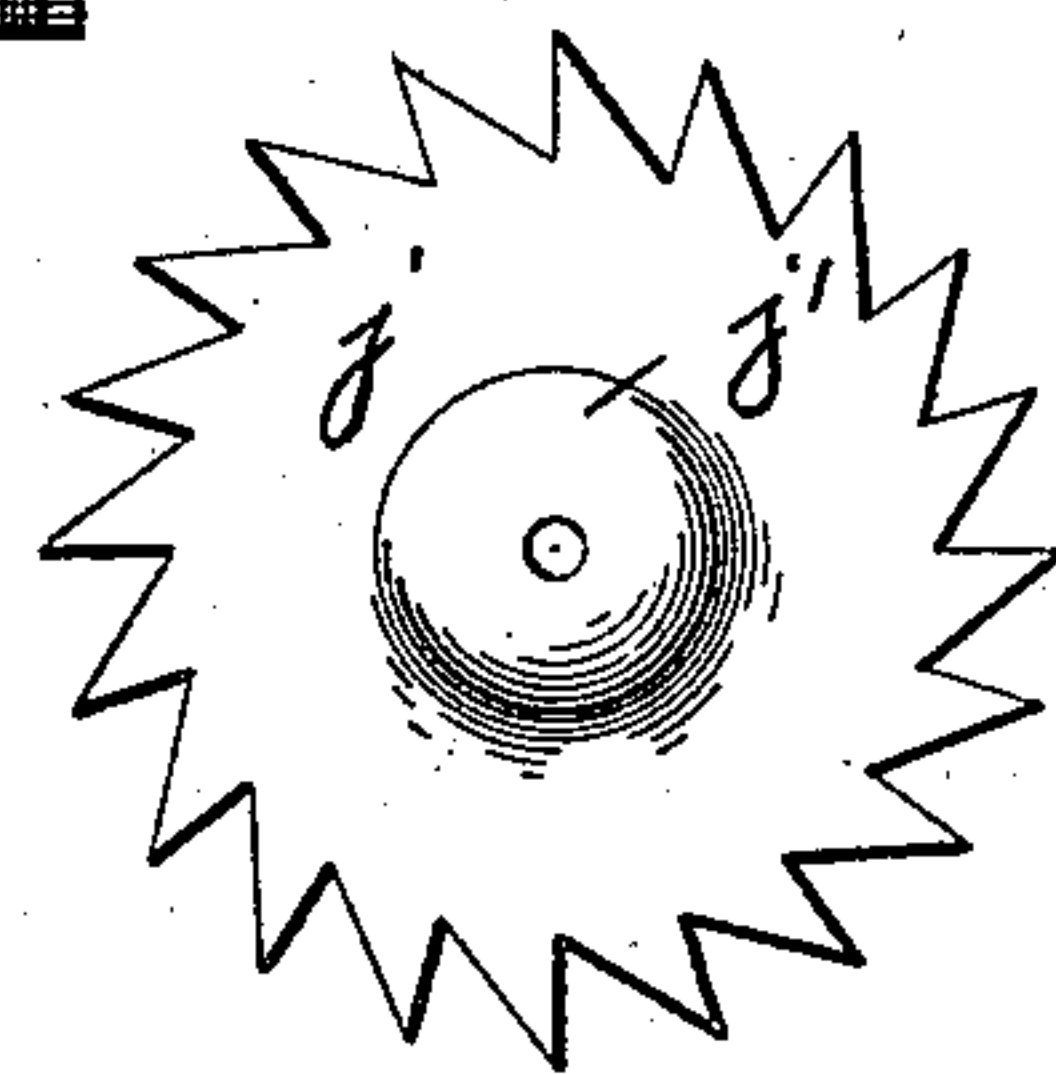
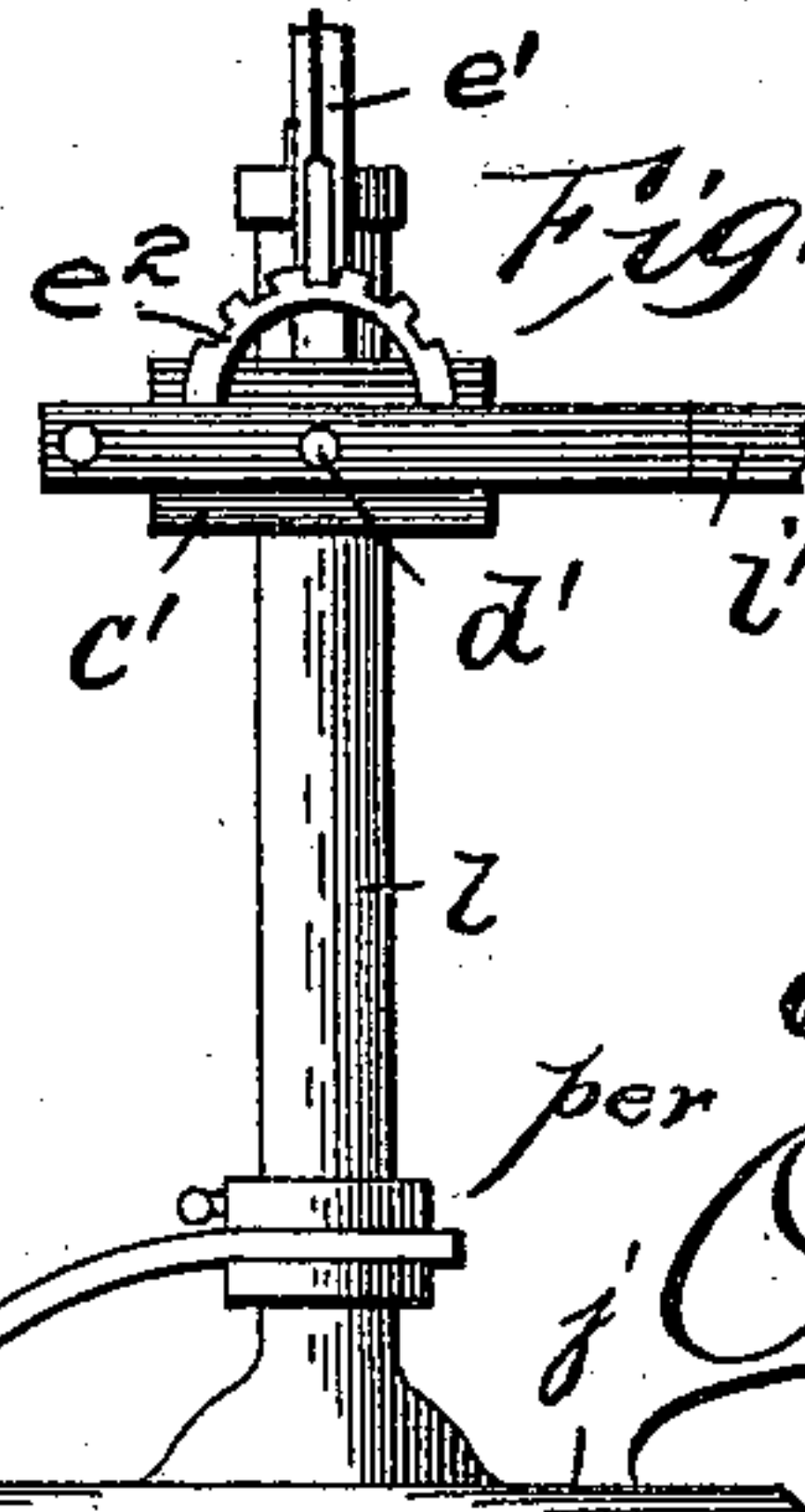


Fig. 6.



Attests
E. E. Whipple
Hubert C. Peck

Inventor
E. E. Whipple
per
O. E. Duff
Attorney

UNITED STATES PATENT OFFICE.

EFFINGER E. WHIPPLE, OF ST. JOHNS, MICHIGAN.

HARROW.

SPECIFICATION forming part of Letters Patent No. 556,075, dated March 10, 1896.

Application filed March 23, 1895. Serial No. 542,971. (No model.)

To all whom it may concern:

Be it known that I, EFFINGER E. WHIPPLE, of St. Johns, in the county of Clinton and State of Michigan, have invented certain new and useful Improvements in Harrows; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in disk harrows.

The object of the invention is to provide a simple, practical, and highly-efficient cultivating implement employing adjustable and tiltable horizontally-arranged rotary disks.

The invention consists in certain novel features of construction and in combinations of parts more fully and particularly described hereinafter and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a side elevation of a harrow constructed in accordance with my invention. Fig. 2 is a top plan view thereof. Fig. 3 is a rear end view. Fig. 4 is a vertical section taken centrally through one of the horizontally-arranged disks and its supporting and fastening means and journal-box. Fig. 5 is a top plan of my invention adapted to a walking or hand cultivator, as a corn-cultivator. Fig. 6 is a detail side elevation showing a disk provided with a shoe, also showing a rocking journal-box for the disk mounted in the drag-bar and provided with controlling means. Fig. 7 is a plan of the disk that can be employed having angular edges. Fig. 8 is an end view of a drag-bar, showing the disk journaled in the form of a transversely-rockable cylindrical bearing-block within the end of the drag-bar and arranged to be clamped in the desired transverse tilted position.

In the drawings, *a* is the axle having the supporting-wheels *b* and tongue *c*.

d is a tilting bar usually arranged a distance above and parallel with the axle, and at its front edge hinged or loosely joined to the axle, as by hinges *e*, so that the bar can rock or swing vertically.

f is a lever rigid with and extending up

from said bar to rock the same, and *g* is a rack secured to the axle to receive the pawl of the lever and by means of which the bar is held in the desired position with respect to the axle. *h* are laterally-swingable clevises pivoted to the bar and extending rearwardly therefrom.

i are the rearwardly-extending and vertically and laterally movable drag-bars. Each bar is capable of a transverse twisting or rocking movement. The front ends of these bars are loosely and adjustably joined to their respective clevises in any suitable manner, as by link or loop, such as shown. The rear end of each drag-bar carries a horizontally-disposed rotary cutting and cultivating disk *j*, rotated by the forward movement of the machine.

Each disk preferably consists of a thin flat piece of metal with its outer edge or edges formed into cutting-edges. This disk can be formed circular with an unbroken cutting-edge or, if desired, can be formed in shape other than circular with angular cutting-edges—such, for instance, as shown in Fig. 7, where the cutting-edge is formed of a series of points wherein the rotating and cutting properties of the disk are enhanced.

Each disk has a slight center upward bulge or boss *j'*, centrally perforated and of sufficient size to receive the head of securing-bolt *k*, passing up through the boss and the vertical tube *l*. This tube is preferably flared out at its lower end to fit on the upper surface of the top boss of the disk, and the tube extends up through a journal-box *m* in or on the drag-bar. At its upper end, above the journal-box, the tube has a closing cap or means through which the bolt passes and on which the nut of the bolt clamps, so that the disk, tube, and bolt are secured and rotate together in the journal-box.

l' *l'* are collars or stops adjustably clamped on the exterior of the tube above and below the journal-box to hold the tube therein in the desired vertical adjustment and by means of which the drag-bar can be adjusted vertically.

The journal-box preferably consists of a suitable block clamped between the two bars composing a drag-bar. However, I do not limit myself to the employment of such spe-

cific form of journal-box, as it is obvious that any suitable bearing can be provided, so that the drag-bars or any suitable supports carry the rotatable disks.

5 From the illustration of this construction it will thus be clear that if the lever of the tilting bar is moved forward the rear edge of said bar and the clevises will be raised, thereby raising the front ends of the drag-bars and
10 hence depressing the rear edges of the disks and raising their front edges from the ground out of operative adjustment. This is the usual adjustment of the machine when being moved or transported, as the rear edges of
15 the disks serve as shoes and slide along or rotate without cutting the soil.

When it is desired to work the soil or cultivate, said lever of the tilting frame is thrown in the opposite direction, depressing the rear
20 edge of the tilting bar and its clevises and the front ends of the drag-bars, thereby throwing down the front edges of the disks, so that they cut into and under the surface of the soil and thoroughly pulverize and cultivate
25 the same in a most thorough and effective manner.

The cultivating depth or depth of cut of the disks is regulated by their angle of inclination or downward pitch, which can be controlled to a nicety according to existing conditions and sort of soil or kind of work to be done.

If desired, in order to insure the direction of rotation and a positive rotation of the various disks, each can be tilted slightly to one
35 side or transversely, so that one side edge will be slightly lower than the opposite side edge. This inclination is also sometimes arranged oppositely to disks on opposite sides
40 of a tool, so that the disks on one side will rotate in an opposite direction to those on the other side, and hence the implement will move forward steadily and true without lateral shifting or jumping, which might be the case
45 if all the disks should happen to be rotating in the same direction.

The lateral inclination can be given to the disks in any desirable manner and they can be either originally set in such position as desired, or else they can be adjustable transversely.

If desired, the drag-bars can be loosely connected by a transverse bar *n*, carrying a rack, a transversely-movable lever *n'* being
55 fulcrumed to the axle and pivoted to said bar with a pawl to engage the rack. By this means the drag-bars, and consequently their disks, can be tilted laterally in either direction and to the extent desired and held in the desired
60 position. The drag-bars on opposite sides of the center of draft are preferably provided with tilting means independent of each other, so that the disks on opposite sides of the center can be oppositely tilted.

65 This invention can be most readily adapted to corn or hand cultivators or harrows, as

shown in Fig. 5, wherein the freely vertically, laterally and rockable drag-bars *i'* have rearwardly-extending handles *a'*, so that the operator can rock the disks fore and aft or
70 transversely, as desired.

If desired, each disk can have a rearwardly and downwardly extending shoe *b'*—such, for instance, as shown in Fig. 6—confined at its upper end to the disk hub or tube
75 to prevent vertical movement of the shoe, yet so that the tube freely turns therein. These shoes can be adjusted to gage the cutting-depth of the disks; also when the disks are tilted rearwardly for transportation the
80 shoes slide on the ground and support the parts. Each shoe moves laterally and up and down with its disk, and they are particularly intended for use in the cultivation of corn.

It is also within the scope of my invention
85 to dispense with the tilting bar and adjusting means on the axle and provide pivoted tilting or adjustable journal-boxes for the disk in the drag-bars, frame or other carriers. Figs. 5 and 6 show a journal-box *c'*, having
90 side pintles or pivots *d'*, turning in the drag-bar side pieces to permit tilting of the box or to raise or lower the front edge of the disk. Suitable means can be employed to lock or
95 hold the boxes in the desired position, such as lever *e'* on the box having a pawl engaging a rack *e²* of the drag-bar, for the purpose of tilting and locking the box. The other figures show the boxes without the lever, the boxes being held by clamping-bolts *d²* passed
100 through the drag-bar sides to clamp the box rigidly between them when swung on their pivots *d'* to the desired angle; also, if desired, the movable frame or drag bars can have laterally-turnable journal-boxes *f'* for
105 the disks, as shown in Fig. 9, wherein the disk sleeves are mounted in cylindrical boxes *f'*, mounted to turn between the drag-bar sides *i² i²*, and to be clamped in desired position to give the desired transverse inclina-
110 tion to the disks. Clamping-bolts passing through the drag-bar sides can be employed to hold the boxes in the desired position. The opposite or fore-and-aft adjustment can be effected through the medium of the drag-
115 bars, as before described, this arrangement being particularly intended for the corn or hand cultivator wherein the lateral adjustment is preferred at the rear. Any desired number of these disks can be employed as
120 found necessary or desirable.

The laterally-movable and tilting disks can be employed in any suitable frame, and the invention is not limited to the specific construction here described in minute detail
125 for the purposes of clearness.

When my invention is adapted in a large or riding harrow having a driver's seat and a number of disks the adjustment is preferably at the front by levers, substantially as described, within convenient reach from the
130 driver's seat, usually two or three levers being

employed for this purpose, one to raise and lower the front edges of the disks and the other or others movable transversely to the line of draft to tilt the disks sidewise or transversely.

Particular advantages are attained by having the disks movable independently of the main frame or support, and by having the disks movable laterally, and by governing the cultivating depth by the pitch or suction angle of the disks, and by giving the disks the desired side pitch.

It is evident that various slight changes might be made in the forms and constructions herein set forth without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the exact constructions herein set forth, but consider myself entitled to all such changes as fall within the spirit of my invention.

What I claim is—

1. An agricultural implement having a horizontally-disposed rockable rotary cultivating-disk, and means, substantially as described for raising and lowering the front edge of said disk so as to throw the disk into and out of operative adjustment, substantially as described.

2. An agricultural implement having a horizontally-disposed rotary cultivating-disk, loosely connected with its supporting-frame to permit lateral and fore-and-aft tilting of the disk, substantially as described.

3. A support having a vertically-disposed bearing, in combination with a vertical rotary tube extending through and above and journaled in the bearing and provided with stops above and below the same, a cap at the upper end of the tube and the lower end thereof flared outwardly, a flat disk having a central upward bulge fitting in said lower flared end, and a bolt passing through said bulge and

the tube and cap and securing the parts detachably together, substantially as described.

4. An agricultural implement having laterally and vertically movable bars, horizontally-disposed rotary cutting-disks having vertical hubs mounted in said bars, means substantially as described to tilt the disks sidewise and means to hold the disks with their front edges in the desired elevation.

5. An agricultural implement having a horizontally-disposed rotary cutting-disk provided with an upwardly-extending hub or sleeve turning in the frame or support, means for tilting said disk, and the shoe extending rearwardly and downwardly from the sleeve which rotates independently thereof, substantially as described.

6. In an agricultural implement, an axle and its wheels, a rocking bar loosely connected with the axle, means to tilt said bar and lock it at the desired angles with respect to the axle, drag-bars at their front ends loosely connected with the bar so as to be raised and lowered as the bar is rocked, the upright sleeves or hubs at their upper ends turning in the drag-bars and at their lower ends provided with horizontally-disposed rotary cutting-disks tilted by the movement of the drag-bars, substantially as described.

7. An agricultural implement having the rearwardly-extending loose drag-bars, tiltable journal-boxes in the rear portions thereof and the horizontally-disposed disks having the sleeves or hubs mounted to turn in said boxes.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

EFFINGER E. WHIPPLE.

Witnesses:

G. M. PETRIE,

G. N. RICHARDSON.