

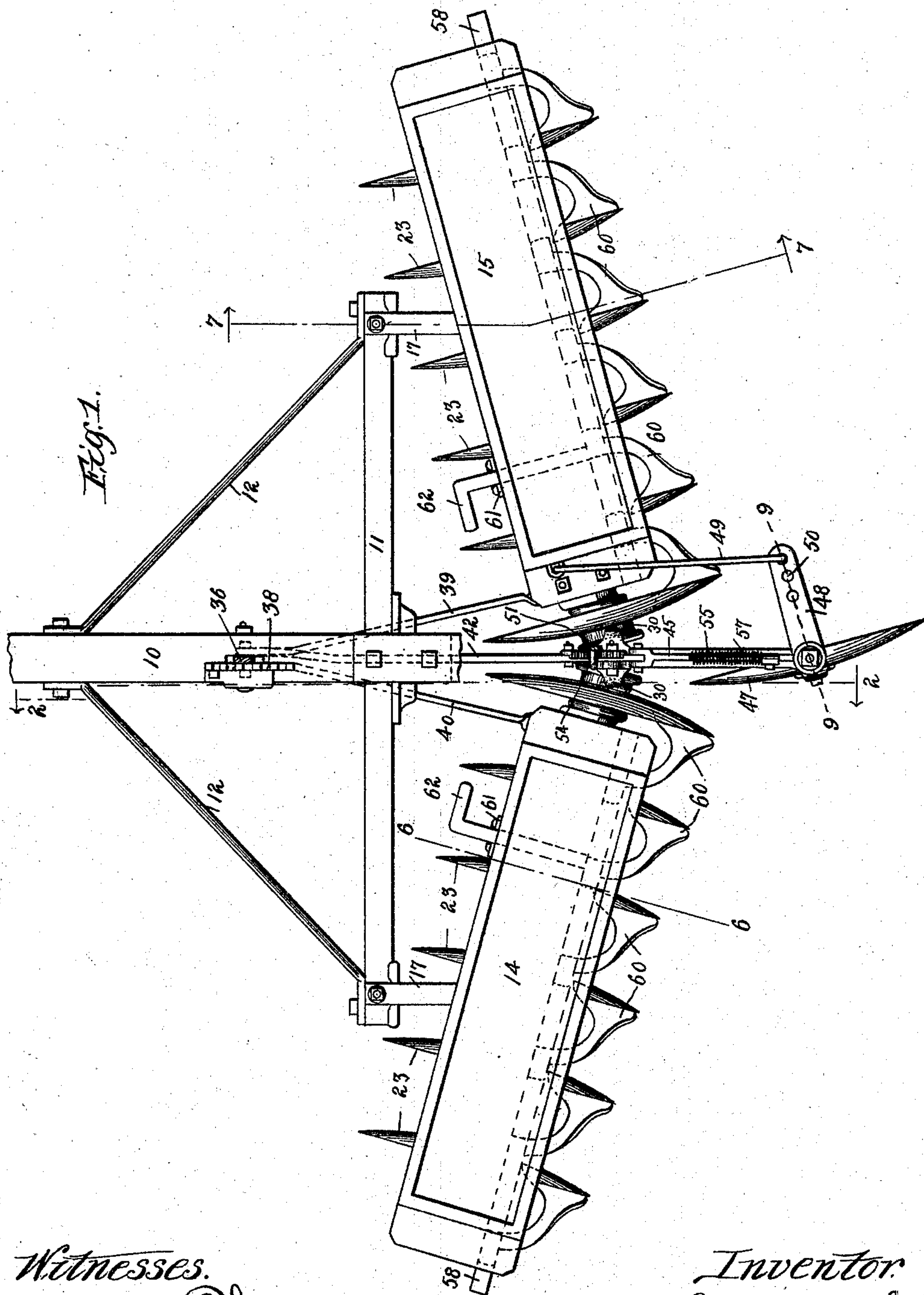
(No Model.)

4 Sheets—Sheet 1.

J. MACPHAIL.
DISK HARROW.

No. 528,172.

Patented Oct. 30, 1894.



Witnesses.

Wm. M. Rheem.

Ralph Van Dyke.

Inventor.

James Macphail

By

Donald Adams, Richard Jackson
his Attys

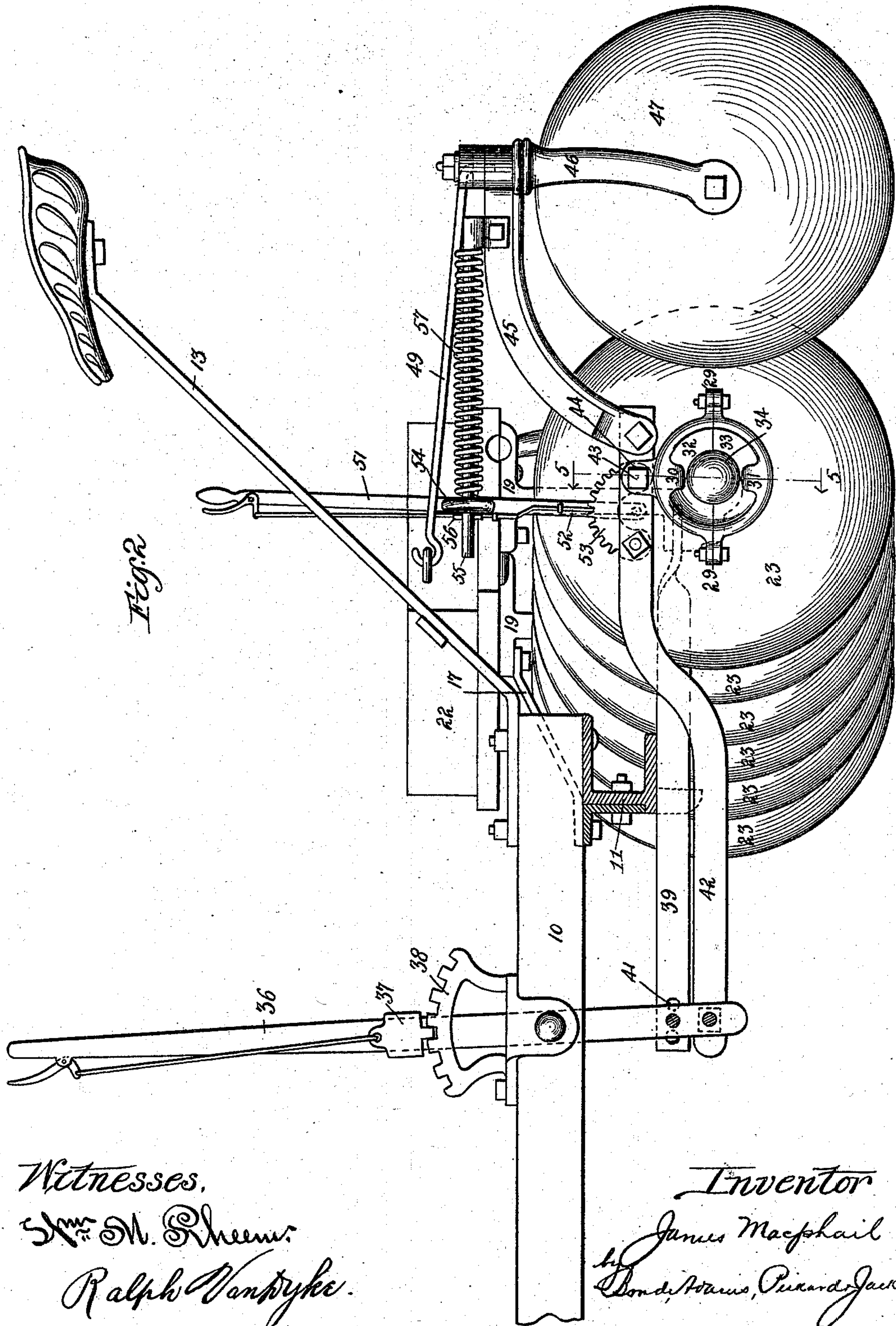
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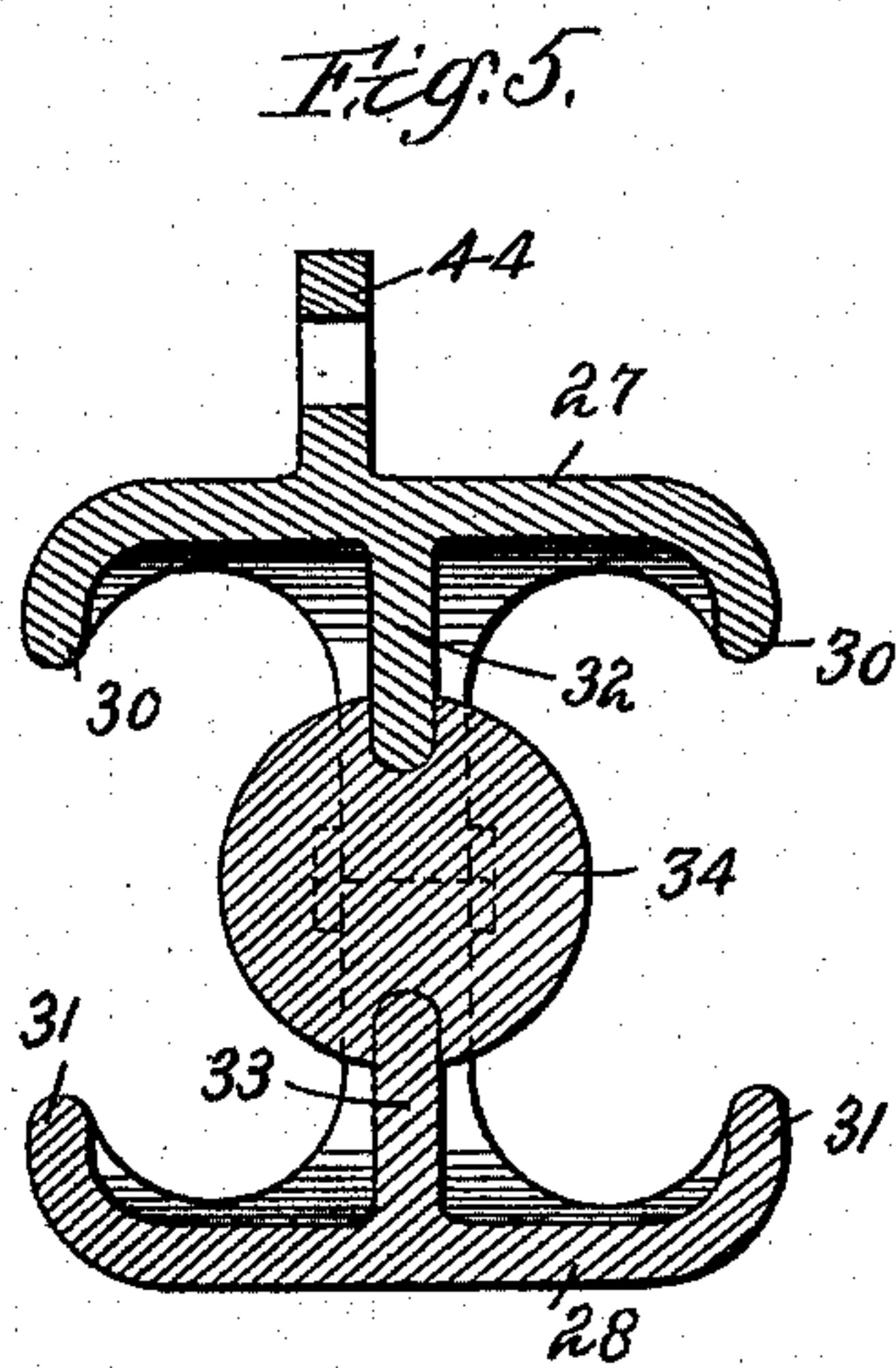
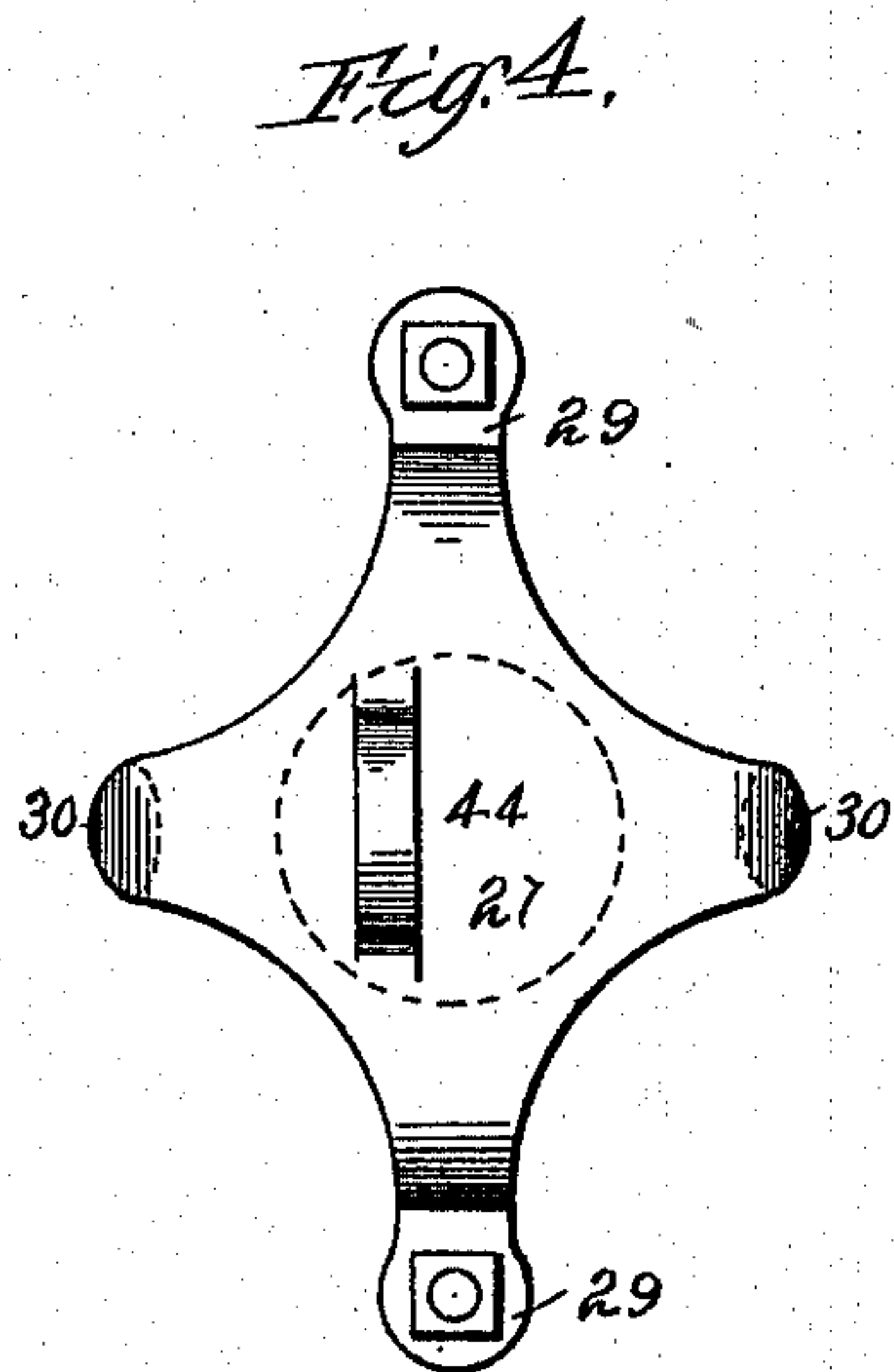
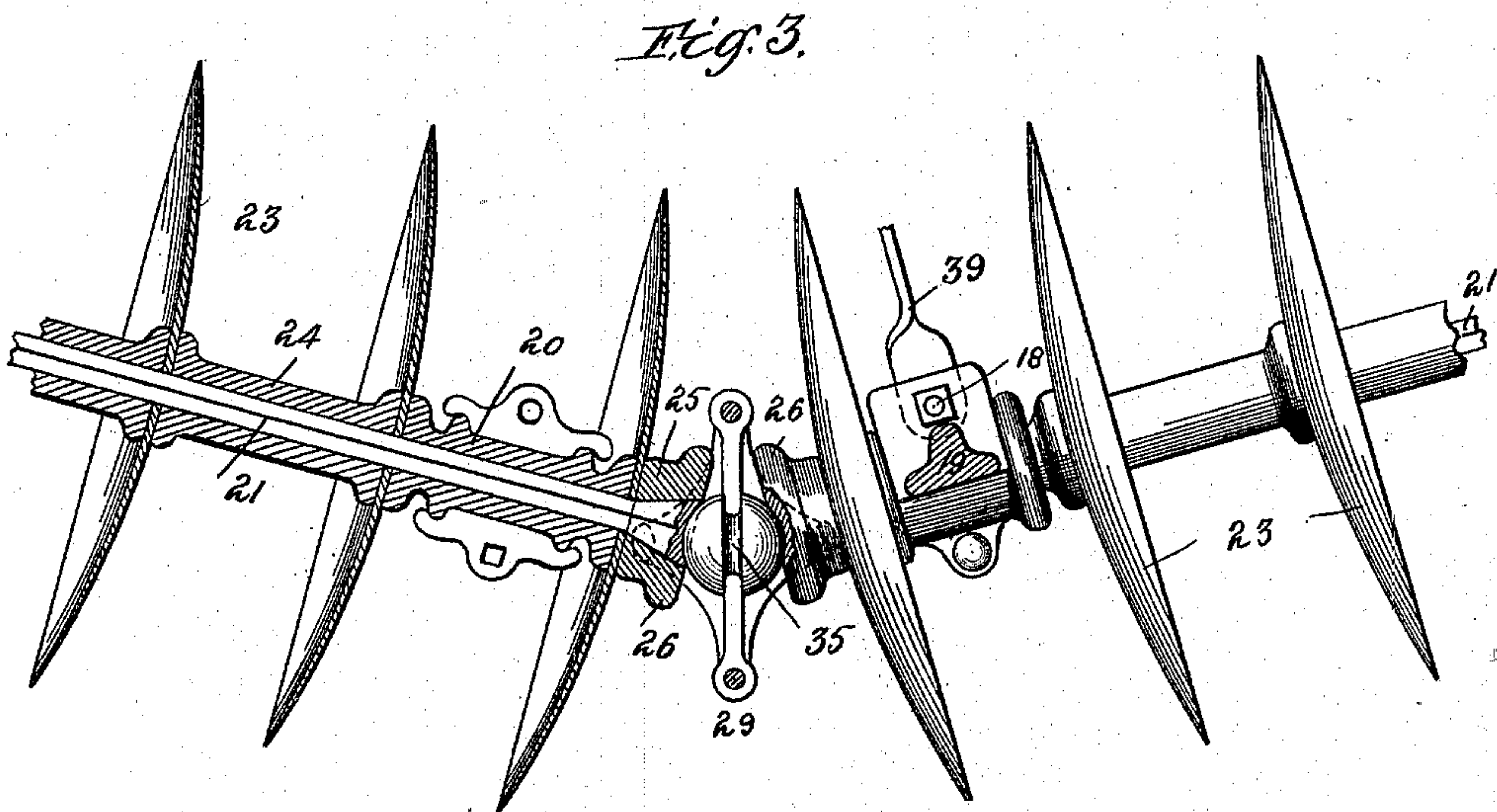
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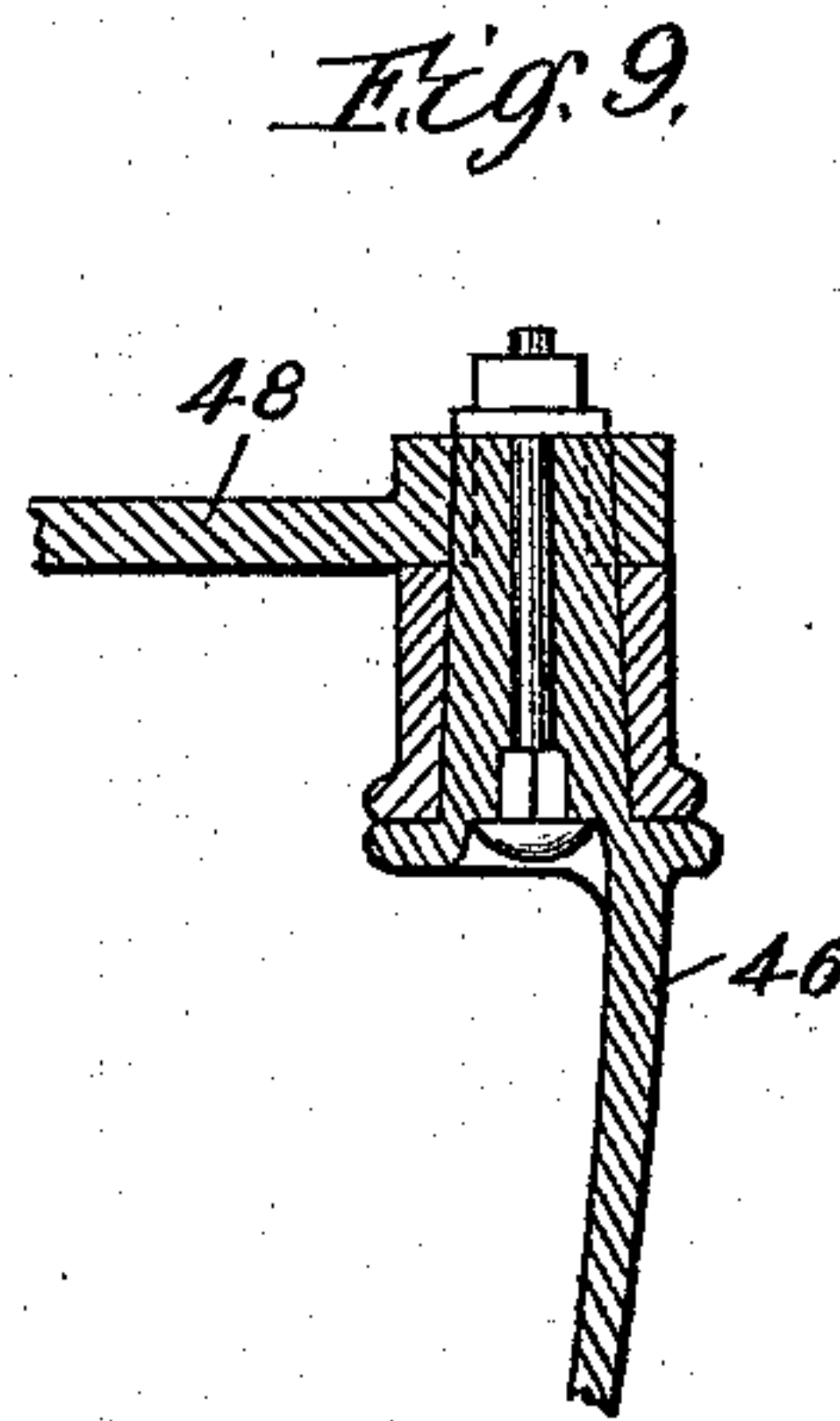
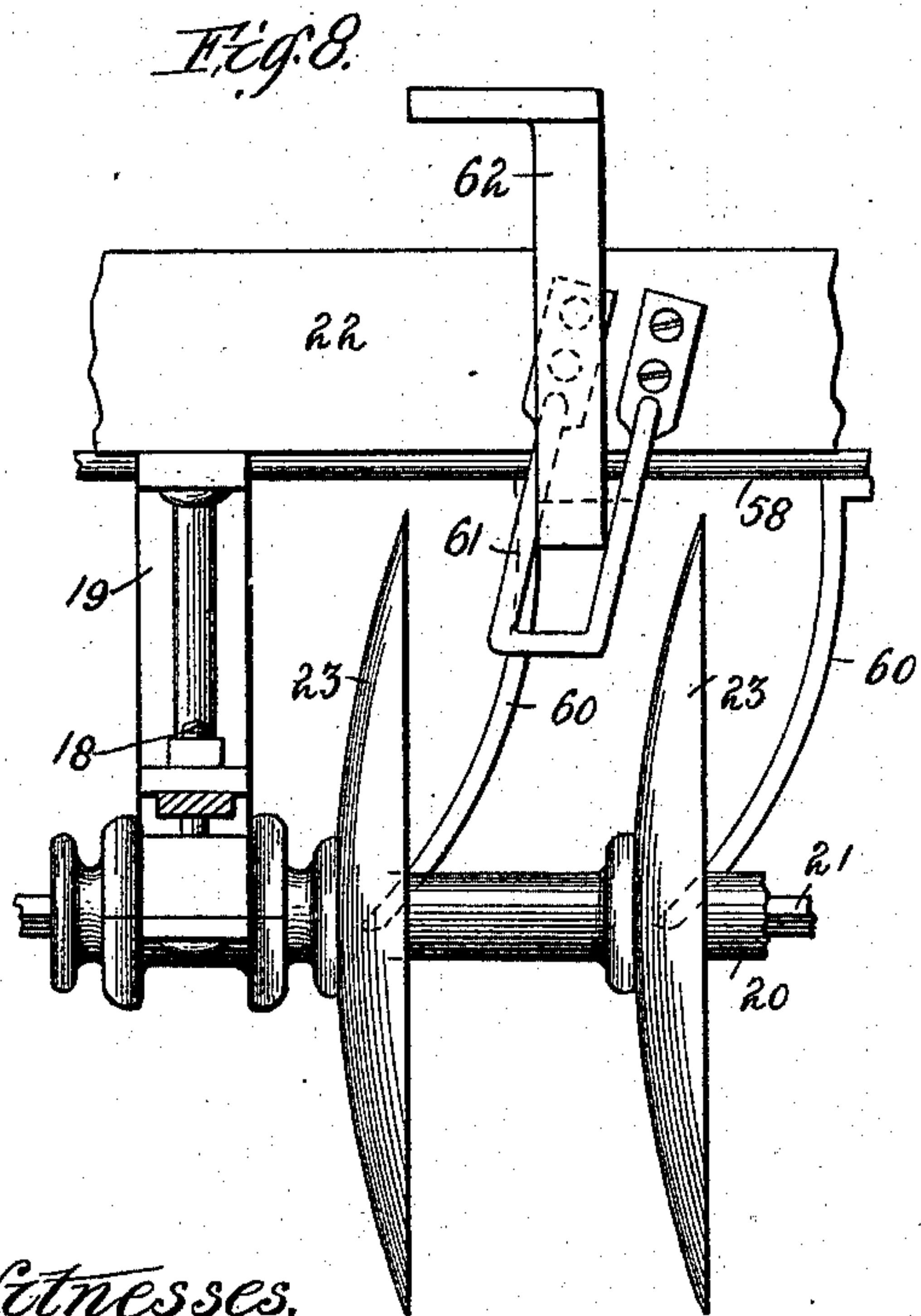
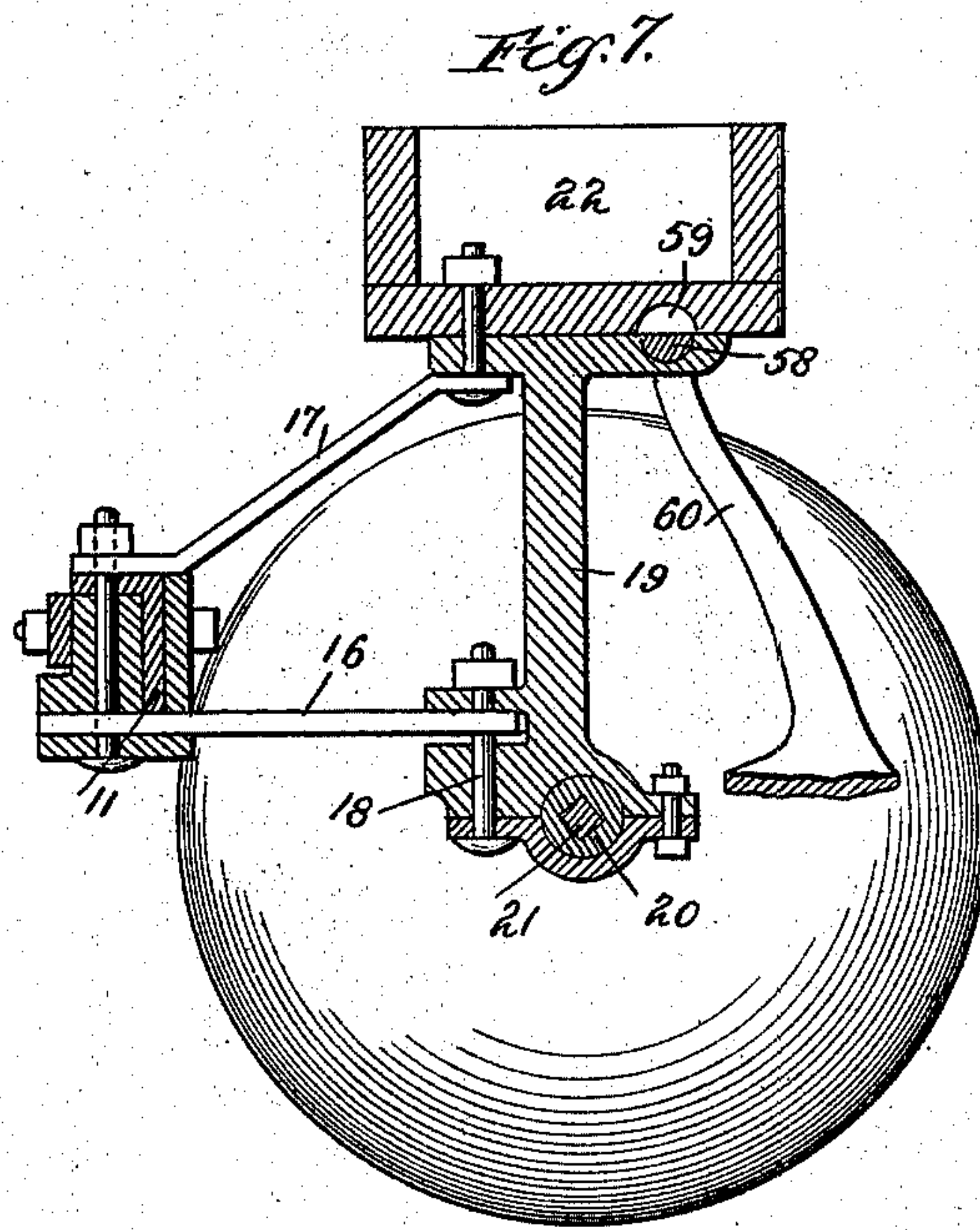
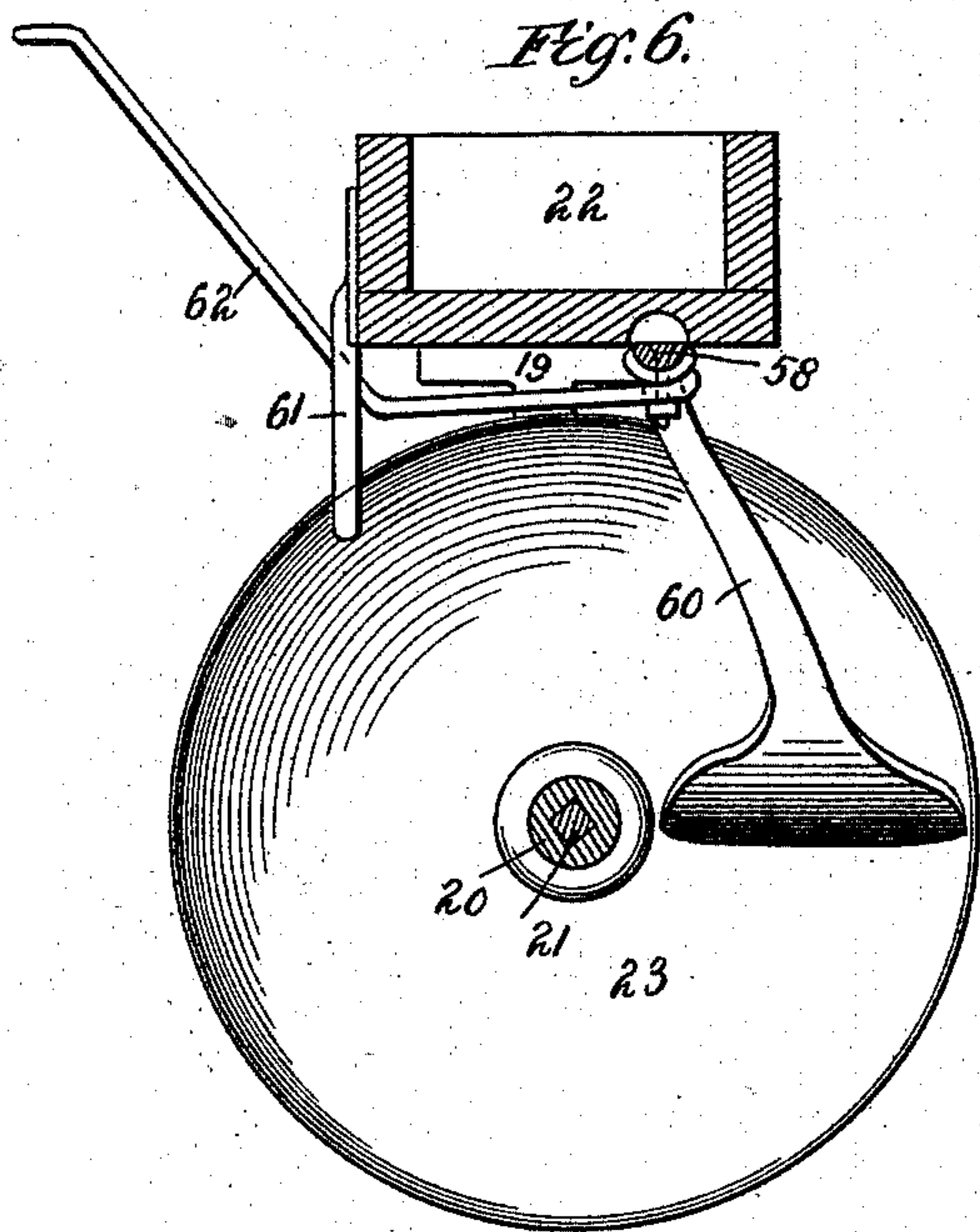
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UNITED STATES PATENT OFFICE.

JAMES MACPHAIL, OF ROCKFORD, ASSIGNOR TO ABRAM ELLWOOD, OF
DE KALB, ILLINOIS.

DISK HARROW.

SPECIFICATION forming part of Letters Patent No. 528,172, dated October 30, 1894.

Application filed June 1, 1893. Serial No. 476,274. (No model.)

To all whom it may concern:

Be it known that I, JAMES MACPHAIL, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Disk Harrows, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a top or plan view. Fig. 2 is a section on line 2—2 of Fig. 1. Fig. 3 is an enlarged detail, being a view of the adjacent ends of the disk gangs, one of the gangs being in section. Fig. 4 is a plan view of one of the coupling plates. Fig. 5 is an enlarged detail, being a vertical section on line 5—5 of Fig. 2. Fig. 6 is a section on line 6—6 of Fig. 1. Fig. 7 is a section on line 7—7 of Fig. 1. Fig. 8 is an enlarged detail, being a front view of one of the gangs, showing the mechanism for shifting the scrapers; and Fig. 9 is a partial sectional view on line 9—9 of Fig. 1.

My invention relates to disk harrows, and has for its object to provide a new and improved harrow which will be well adapted for the different kinds of work to which such implements are usually subjected.

Disk harrows as heretofore constructed have not, as a usual thing, been provided with any device for cultivating the narrow strip left between the adjacent ends of the harrow gangs. In some cases, however, such devices—consisting of a shovel or of disks—have been provided. In implements in which a disk has been used for the purpose stated, it has been secured to the inner end of one of the disk gangs in such manner that the central disk would move with the gang and would be adapted to cultivate the ground between the inner disks of the gangs. When such gangs were adjusted, however, the central disk would be moved in the arc of a circle, and would therefore be moved more or less out of line, which is objectionable, as it necessitates the re-adjustment of the central disk. This objection is avoided in my present invention by providing a disk which is movable in the line of draft, so that when the disk gangs are adjusted the center disk will also be adjusted, but will always remain on the central line.

Another feature of my invention consists in the provision of improved devices for changing the angle of the central disk so that it will take more or less of the soil.

In using central disks, in addition to the adjustments above suggested it is desirable that means should be provided for lifting the disks in order to avoid stones and other obstacles, and a further feature of my invention consists in providing such lifting devices for the central disks, and in providing means for holding the disks upon the ground with a yielding pressure.

My invention further consists in providing an improved bearing for the inner ends of the disk gangs, whereby their adjustment is more easily effected and the machine is made steadier in its action.

My invention also consists in the provision of improved mechanism for adjusting the disk scrapers, and in certain other features of construction shown; all of which will be more fully set forth in the following specification.

That which I regard as new will be set forth in the claims.

In the drawings,—10 indicates the tongue of the harrow, which is connected to a cross bar 11 and is braced by braces 12, as shown in Fig. 1. The tongue carries a seat-bar 13, as shown in Fig. 2.

14—15 indicate disk gangs, which are arranged at opposite sides of the machine and are pivotally connected to the cross bar 11 by straps 16 and braces 17, as shown in Figs. 1 and 7. The straps 16 are pivotally connected to bolts 18 carried by standards 19, which are mounted upon sleeves 20 mounted upon the gang shafts 21. A standard 19 is provided near the end of each gang, and upon such standards are mounted weight boxes 22, as shown in Figs. 6 and 7. As shown in Figs. 3 and 7, the gang shafts 21 are square in cross section, and upon them are mounted a series of disks 23, which are provided with square holes to adapt them to fit the shafts 21.

24 indicates sleeves or spools which are placed upon the shafts 21 between the successive disks, and serve to hold the disks apart, in the usual manner.

Upon the inner end of each shaft 21 is

mounted a collar 25, which is held in place by swaging the end of the shaft, as shown in Fig. 3. The collars 25 are provided with circumferential flanges 26, as shown in Fig. 3.

5 27—28 indicate upper and lower coupling plates, which serve to couple the inner ends of the gangs together. The coupling plates 27—28 are provided with ears 29, by means of which they are secured together, as shown
10 in Figs. 2 and 5. The plate 27 is provided at its edges with flanges 30, which extend downward and are opposite to similar flanges 31 carried by the lower plate 28, as best shown in Fig. 5. The arrangement is such that the
15 flanges 30—31 will overlap the flanges 26 of the collars 25, so that when the plates 27—28 are bolted together the harrow gangs will be securely coupled together. Such coupling will not interfere with their adjustment at
20 varying angles with each other.

As best shown in Fig. 5, the plate 27 is provided on its underside with a central web or flange 32, and the plate 28 is provided with a similar flange 33 which lies opposite the
25 flange 32 and a short distance from it.

34 indicates a hardened steel ball, the diameter of which is slightly greater than the distance between the flanges 32—33, and said ball is provided with a circumferential groove
30 35, which is adapted to receive the flanges 32—33, as shown in Fig. 5. The ball 34 serves as a bearing for the ends of the gang shafts 21, which are slightly dished to adapt them to form a broader bearing surface. By this
35 construction the gangs are coupled together, and by reason of their having a common bearing the machine is made more of a unit, its action is much steadier, and it may be much more readily adjusted.

40 The angular adjustment of the gangs is effected by means of a hand lever 36, which is mounted upon the tongue 10 and is provided with a dog 37 which engages the notches of a segmental rack 38 mounted upon the tongue,
45 as best shown in Fig. 2. The lower end of the lever 36 extends below the tongue, and is connected by connecting bars 39—40 with the inner ends of the disk gangs, as shown in Figs. 1 and 2. By this construction the angular
50 adjustment of the gangs may be effected by operating the lever 36. The bars 39—40 are preferably provided with a series of adjusting holes 41, as shown in Fig. 2.

42 indicates a connecting bar, the forward
55 end of which is connected to the lever 36 below the connecting bars 39—40. Its rear end is connected to the upper coupling plate 27 by a bolt 43, which passes through an ear 44 formed on the upper side of said coupling
60 plate, as best shown in Fig. 5.

45 indicates a curved bar, the forward end of which is pivotally connected to the rear end of the bar 42 back of the ear 44, its rear end forming a bearing for a disk standard
65 46, which carries the central disk 47. By this construction, when the lever 36 is operated to move the inner ends of the disk gangs

forward or backward, the central disk 47 will be moved in the same direction and will remain in the line of draft. To effect the angular adjustment of the central disk 47, the
70 standard 46 is provided at its upper end with an arm 48, which is keyed thereto and projects in a substantially horizontal plane therefrom. The arm 48 is connected by a rod
75 49 to the inner end of one of the disk gangs, as shown in Fig. 1. I prefer to provide the arm 48 with a series of adjusting holes 50, so that the degree of adjustment may be varied. By this construction, when the central disk is
80 moved forward or backward the angle of the disk 47 will be changed, it being turned to a greater angle with the line of draft when the disks are moved forward. This angular adjustment is desirable owing to the fact that
85 when the disk gangs are adjusted angularly the forward edges of the inner disks are thrown toward and from each other, thereby making the central strip narrower or wider as the case may be, and the angular adjustment of the central disk compensates for such
90 adjustment of the gangs.

To lift the central disk 47 in a right line to avoid obstacles, such as stones, roots, &c., I provide a lever 51, which is pivotally mounted
95 upon the bar 42 near its rear end, as shown in Fig. 2, which lever 51 may be locked in position by a dog 52 which engages the notches of a segment 53 secured upon the bar 42, as
100 shown in Fig. 2. The lever 51 is provided with a boss 54 at one side, through which boss passes a rod 55, the rear end of which is pivotally connected to the upper end of the bar 45, as shown in Fig. 2.

56 indicates a pin which passes through the
105 rod 55 forward of the boss 54.

57 indicates a spring, which is mounted upon the rod 55 between the boss 54 and the pivotal point of said rod. By this construction, by
110 operating the lever 51 the disk 47 may be moved upward in a right line sufficiently to avoid ordinary obstacles.

The connections of the rod 49, which is connected to the arm 48 and to one of the gangs, as above described, are loose, to permit of such
115 movement of the central disk. By mounting the central disk as above described, the spring 57 will exert a downward pressure upon it, holding it yieldingly in contact with the soil, so that the disk may yield sufficiently to pass
120 over small obstacles.

The vertical movement of the central disk 47 in a right line is advantageous, in that it is possible to vary the depth of the furrow produced by the disk, and it is more readily controlled than a disk which simply turns laterally, because when the disk is in a furrow it is difficult to turn it laterally, as the dirt on each side tends to resist such movement. It is possible, however, to readily lift the disk
125 in a right line; and, furthermore, the depth of the furrow can be varied without changing the line of the furrow, which is impossible with a disk that simply turns laterally, as

in this construction the disk would shift the furrow to one side of the original line.

58 indicates scraper-supporting rods, which are supported in suitable bearings in the standards 19. I prefer to make the rods 58 of half round iron, as shown in Figs. 6 and 7.

59 indicates a channel formed in the under side of the weight boxes 22 over the scraper rods 58, as shown in Figs. 6 and 7. This arrangement is to permit of the partial rotation of the rods 58.

60 indicates scrapers, which are mounted upon the rods 58 and are provided with broad scraping surfaces adapted to scrape the concave surfaces of the disks 23.

61 indicates a stirrup, having inclined inner edges, as shown in Fig. 8. A stirrup 61 is secured to the weight box 22 of each gang, as shown in Fig. 1.

62 indicates a foot lever, one of which is secured to each scraper rod 58, passing under the weight box 22 and through the stirrup 61, as shown in Fig. 8. The weight of the scrapers 60 is sufficient to normally hold them in the position shown in Fig. 6 when they are out of contact with the surfaces of the disks. By depressing the foot lever 62 the scraper rod 58 to which it is attached will be partially rotated, and at the same time will be moved longitudinally, owing to the fact that the lever 62 will be guided laterally by the inclined sides of the stirrup 61. The scrapers will thereby be forced into contact with the disks, and the pressure of the scrapers upon the disks will be regulated by the pressure upon the foot lever. When the foot lever is released the scrapers will swing back out of contact with the disks.

Although the coupling devices are herein shown as used in connection with disk-gangs, it is obvious that any other suitable cultivating devices can be employed in lieu of the disks, without affecting the operation of the coupling or connecting plates between the disk-gangs.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with two disk-gangs, of a pair of connected plates which couple the disk-gangs together at their inner ends and are provided with projecting flanges, and a ball having a circumferential groove into which said flanges extend, substantially as described.

2. The combination with two disk-gangs, of a pair of plates 27 and 28 which loosely engage and connect the disk-gangs together at their inner ends and are provided with flanges projecting toward each other, and a ball interposed between and engaged with the inner edges of said flanges, substantially as described.

3. The combination with two disk gangs

having their shafts provided with flanged collars 25, of plates 27 and 28 having flanges 32 and 33 projecting inward toward each other and flanges 30 and 31 which couple the flanged collars of the shafts together, and a ball 34 having a circumferential groove into which the said inwardly projecting flanges extend, substantially as described.

4. The combination with a disk-gang, of a laterally movable scraper-bar 58, carrying scrapers, a vertically swinging lever 62 connected with the scraper-bar and movable bodily in lateral directions, and an inclined guide for directing the movements of the lever, substantially as described.

5. The combination with two gangs of disks, of an angularly adjustable central disk arranged between the innermost disks of said gangs and movable vertically in a right line, mechanism for angularly adjusting the disk relatively to the line of draft, and means for moving the central disk vertically in a right line, substantially as described.

6. The combination with two gangs of disks, of a central disk arranged between the innermost disks of said gangs and movable vertically in a right line and also adjustable angularly to the line of draft, mechanism for moving the central disk vertically in a right line, means for angularly adjusting said central disk, and means for locking said central disk in an elevated position, substantially as described.

7. The combination with disk-gangs, of a pivoted-bar 45, a central disk-standard 46 carried by said bar, means for turning the standard on the bar, a pivoted swinging lever 51, a rod 55 connected with the said bar and loosely engaging a part of said lever, and a spring 57 mounted on the rod, substantially as described.

8. The combination with disk gangs, of a pivoted bar 45, a central disk standard carried thereby, lever 51, rod 55 connected to said lever and to said bar 45, and a spring 57 upon said rod 55, substantially as described.

9. In a disk harrow, the combination with two disk gangs, of a lever 36, connecting bar 42, bar 45 pivoted to said bar 42, a central disk standard carried by said bar 45, and connecting bars 39 connecting said lever 36 to said disk gangs, substantially as described.

10. The combination with disk gangs, a lever 36, connecting rods connecting said lever to the disk gangs, a central disk movable in the line of draft, devices connecting said disk with said lever 36, an arm 48 carried by said disk, and a rod 49 connecting said arm with one of the disk gangs, substantially as described.

JAMES MACPHAIL.

Witnesses:

S. M. HUNT,
D. P. CARY.