

No. 832,223.

PATENTED OCT. 2, 1906.

J. M. ULSH.
HARROW.

APPLICATION FILED DEC. 16, 1905.

2 SHEETS—SHEET 1.

Fig. 4.

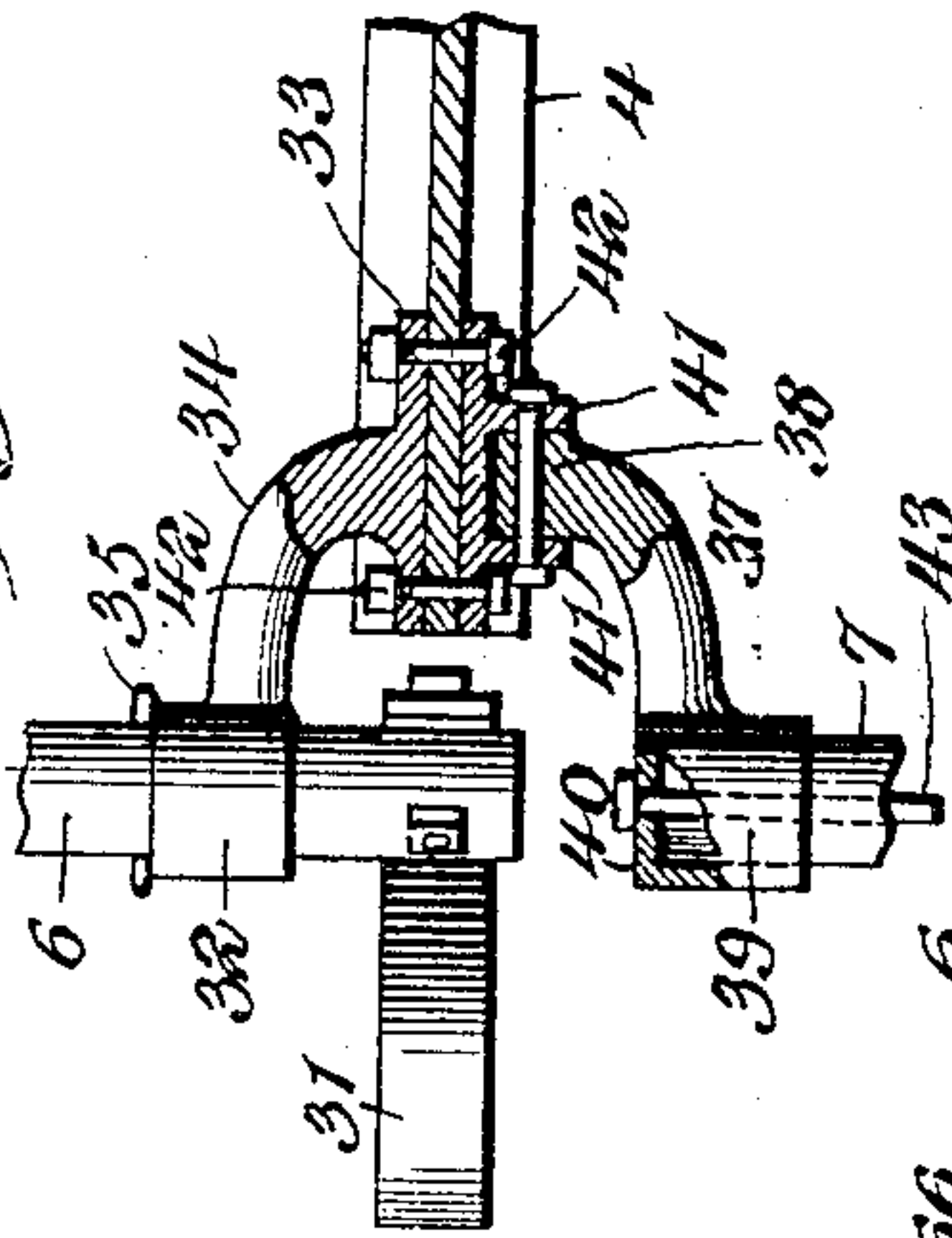


Fig. 9.

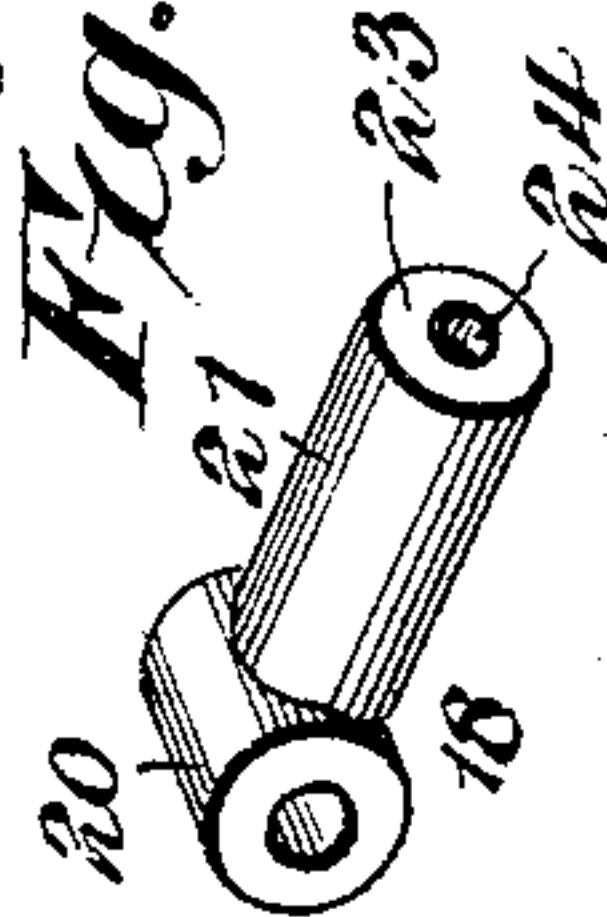


Fig. 1.

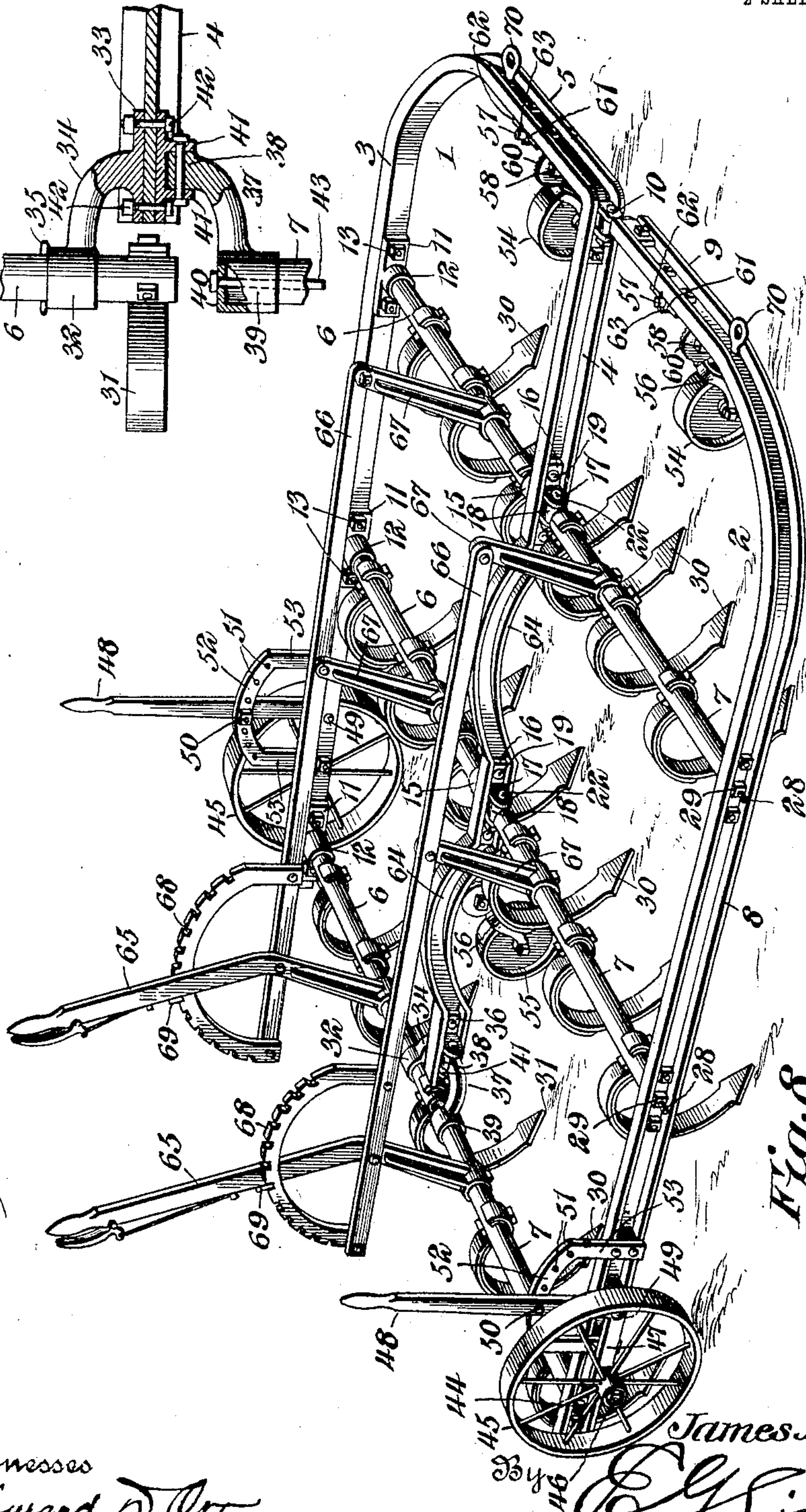
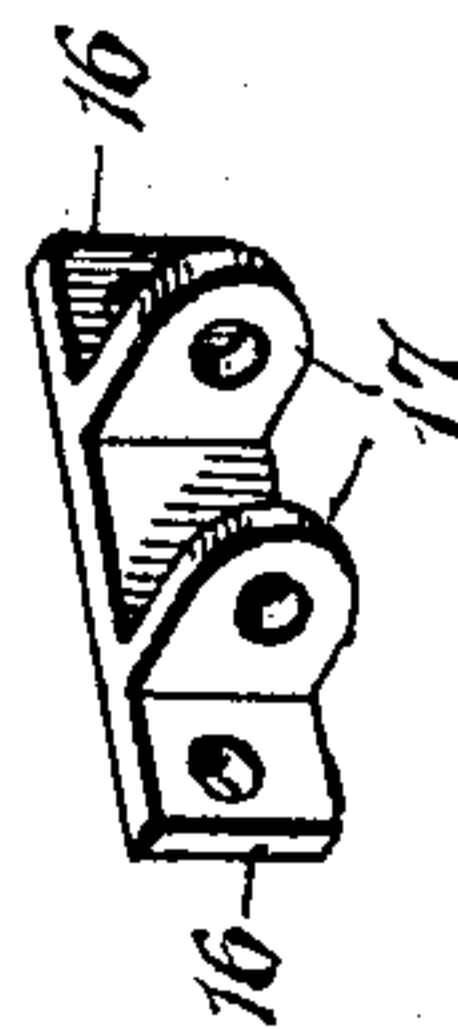


Fig. 8.



Witnesses

Howard D. Orr.
J. F. Piley

Inventor,
James M. Ulsh,

C. G. Siggers.

Attorney

No. 832,223.

PATENTED OCT. 2, 1906.

J. M. ULSH.
HARROW.

APPLICATION FILED DEC. 16, 1905.

2 SHEETS—SHEET 2.

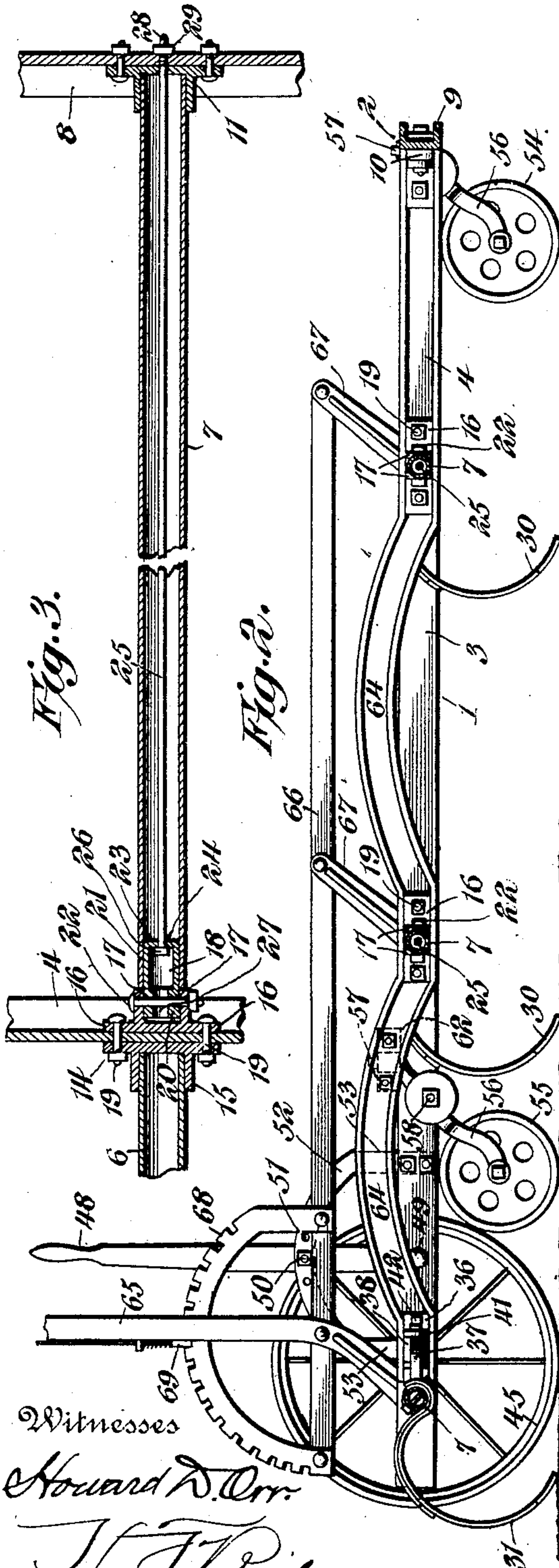


Fig. 7.

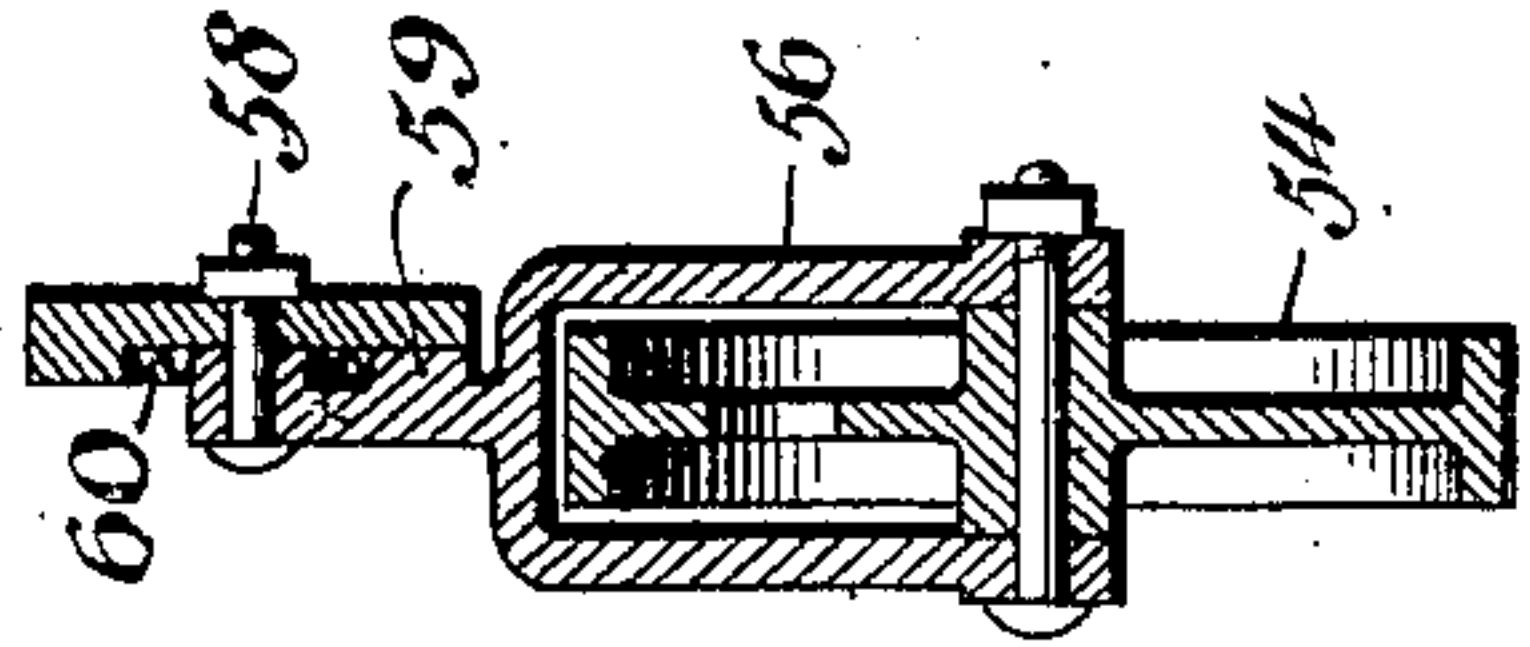


Fig. 6.

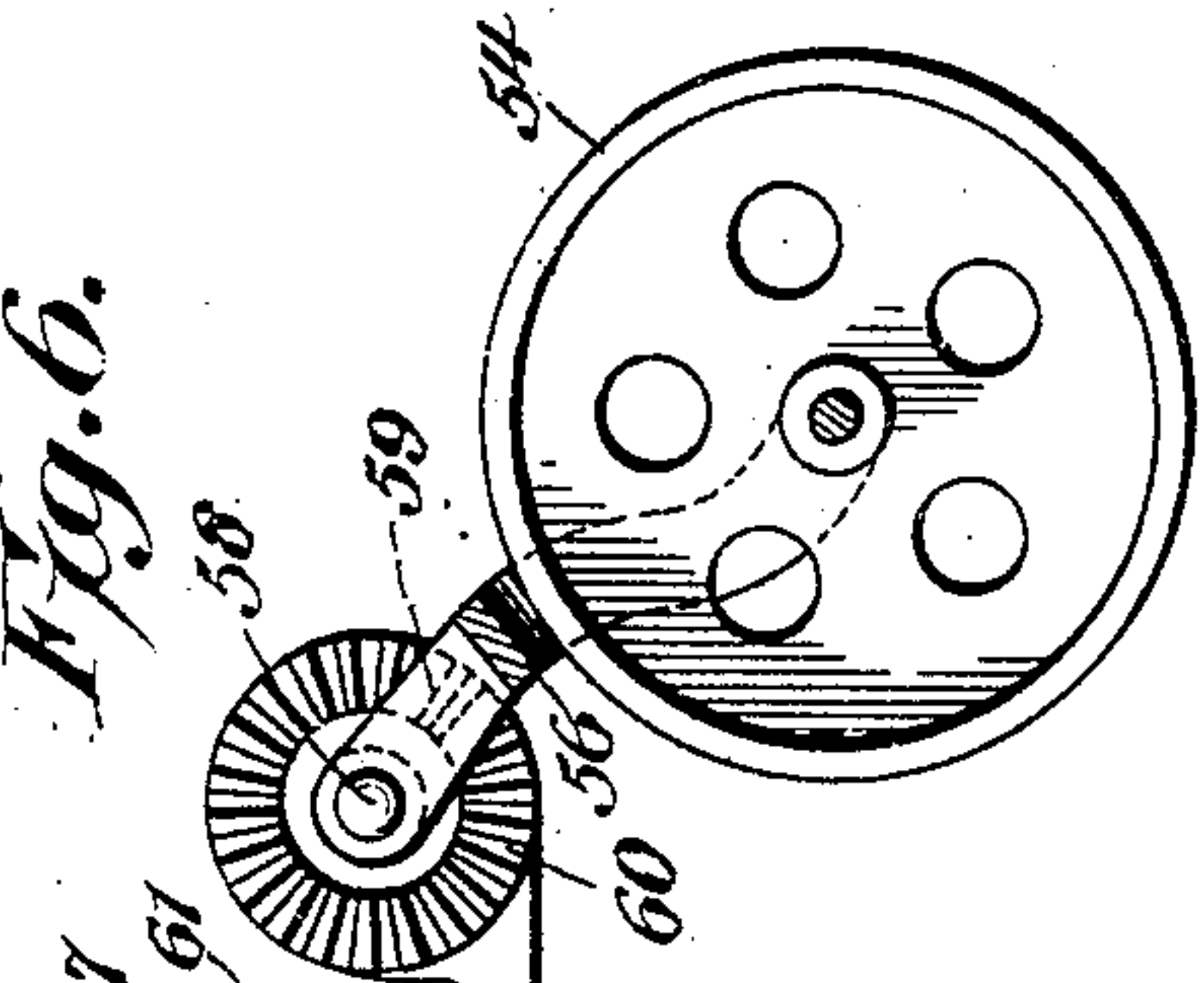
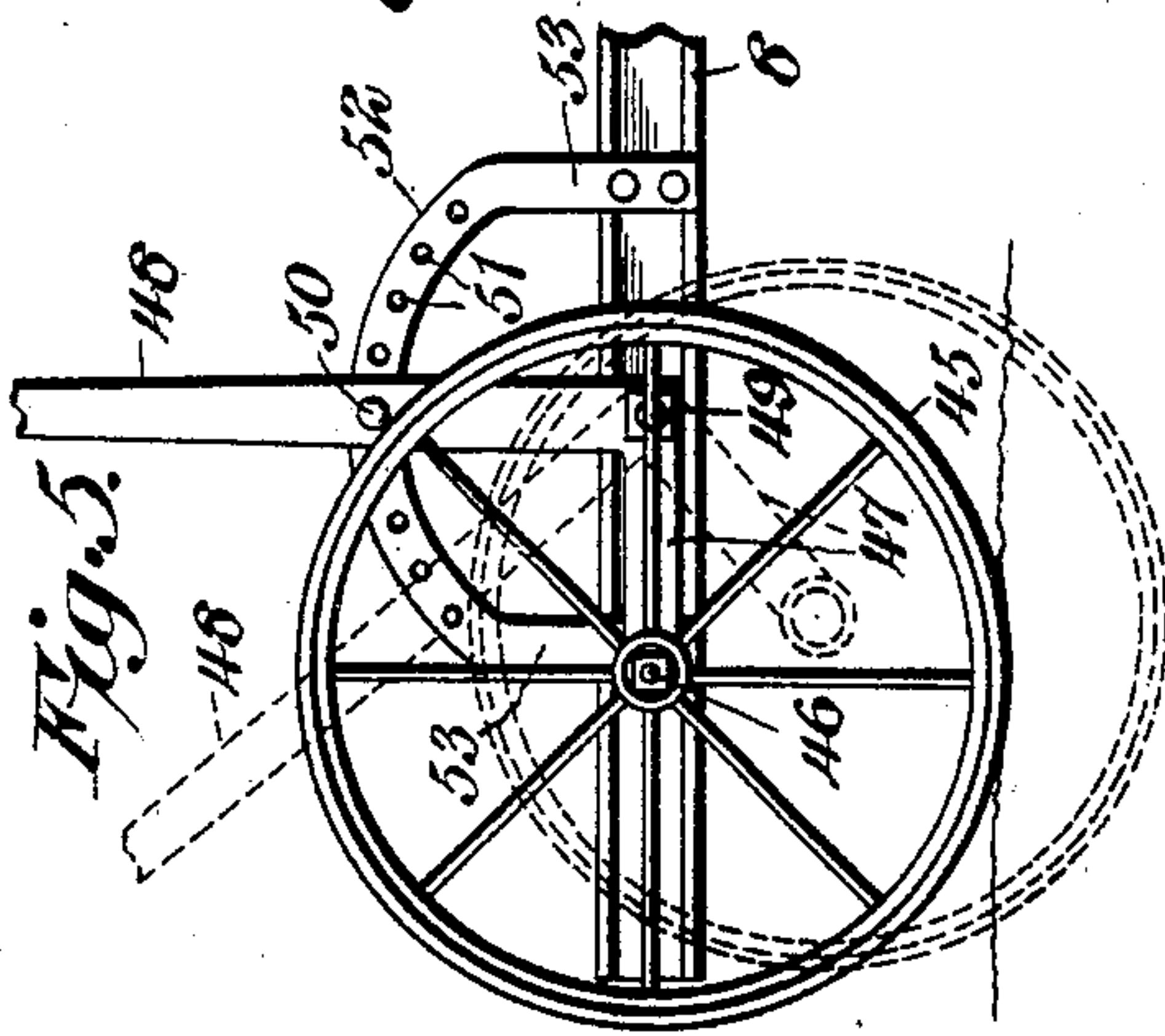


Fig. 5.



Witnesses
Howard D. Orr.
J. F. Piley

James M. Ulsh, Inventor,

By

E. G. Figgert

Attorney

UNITED STATES PATENT OFFICE

JAMES M. ULSH, OF LANCASTER, PENNSYLVANIA.

HARROW.

No. 832,223.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed December 16, 1905. Serial No. 292,079.

To all whom it may concern:

Be it known that I, JAMES M. ULSH, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Harrow, of which the following is a specification.

The invention relates to improvements in harrows.

10 The object of the present invention is to improve the construction of that class of toothed harrows having automatically-adjustable sections to accommodate the harrow to unevenness of land and to provide a simple
15 and comparatively inexpensive harrow of this character of great strength and durability which will be capable of vertical adjustment to regulate the depth of cut and to
20 elevate and lower the harrow-frame to suit various conditions of soil and in which there will be an increased clearance capacity by eliminating all parts at the center of the harrow that would tend to accumulate rubbish and prevent the free passage of the same
25 therethrough.

A further object of the invention is to improve the construction of the harrow-frame and the means for both hinging the sections and mounting the inner ends of the tooth-bars
30 for rotary adjustment.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the
35 accompanying drawings, and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, size, and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or
40 sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a perspective view of a spring-tooth harrow constructed in accordance with this invention. Fig. 2 is a
45 central longitudinal sectional view, the central frame bar or member being shown in elevation. Fig. 3 is an enlarged detail sectional view taken transversely of the harrow, illustrating the manner of mounting the inner
50 and outer ends of the rotary tooth-bars. Fig. 4 is an enlarged detail plan view, partly in section, illustrating the construction for mounting the inner ends of the rear tooth-bars. Fig. 5 is a detail elevation illustrating the construction of the adjustable side wheels

for raising and lowering the harrow-frame. Figs. 6 and 7 are detail views illustrating the construction of the caster-wheels. Fig. 8 is a detail perspective view of one of the hinge-
60 brackets. Fig. 9 is a detail perspective view of the hinge element which coöperates with the bracket.

1 and 2 designate hinge-sections of a harrow-frame, the frame bars or members of
65 which are preferably constructed of channel-bars consisting of a vertical web and upper and lower horizontal flanges; but any other form of angle-iron bar may be employed in the construction of the frame of the harrow.
70 The harrow-frame section 1, which is approximately U-shaped, is composed of an outer longitudinal frame bar or member 3 and an inner central longitudinal frame-bar 4, which is connected at the front of the harrow-frame with the outer member or side bar
75 3 by an integral front bar or member 5 and which is common to both sections of the harrow-frame and extends from the front to the back thereof, the inner ends of all of the tooth-
80 bars 6 and 7 of the harrow being connected with and supported by the said central longitudinal frame bar or member 4. The harrow-frame section 2, which is approximately
85 L-shaped, consists of a longitudinal side frame bar or member 8 and an integral front frame bar or member 9, which is connected with the section 1 at the front end of the central frame bar or member by a hinge 10 of
90 any preferred construction.

In Figs. 1 and 2 of the accompanying drawings three tooth-bars are shown in each set; but it will be apparent that any number of tooth-bars may be employed to provide a harrow of the desired capacity. The tooth-
95 bars, which are tubular and which are capable of rotary adjustment, have their outer ends journaled in bearings 11, consisting of attachment plates or portions and annular bearing-flanges 12, which form sockets for
100 the reception of the outer ends of the tooth-bars. The attachment plate or portion of each bearing extends horizontally in advance and in rear of the socket or bearing portion and is secured to the inner faces of the outer
105 longitudinal frame bars or members by bolts 13 or other suitable fastening devices, which pierce the attachment plate or portion and the webs of the said side bars or members. The inner ends of the front and intermediate
110 tooth-bars 6 of the section 1 are supported by bearings 14, similar in construction to the

bearings 11 and composed of attachment plates or portions and annular bearing-flanges 15, which receive the inner ends of the said tooth-bars 6. The inner ends of the front
 5 and intermediate tooth-bars 7 of the harrow-section 2 are connected with the central frame bar or member 4 by interfitting hinge elements, which form a combination hinge and journal to hinge the sections of the harrow-frame together and to afford the tooth-
 10 bar 7 a rotary movement. One of the hinge elements consists of a bracket 16, having an attachment plate or portion and provided with a pair of spaced perforated ears or lugs
 15 17, which receive between them the other hinge element 18. The attachment plate or portion of the bracket is secured to the central longitudinal frame bar or member in the channel thereof by means of bolts 19, each
 20 bolt piercing the bracket, the web of the frame bar or member, and the attachment plate or portion of the proximate bearing 14. The interfitting hinge element 18 consists of an eye 20 and a tubular journal 21, the eye
 25 being provided with a horizontal bore or opening to receive a bolt 22, which forms a pintle for the hinge and which also passes through the projecting ears or lugs of the bracket 16. The hollow journal fits within the inner end
 30 of the contiguous tooth-bar and is provided with an outer end wall 23, having a central perforation 24, through which is passed a tie-rod 25. The tie-rod 25 is provided at its inner end with a head 26, which engages the in-
 35 ner face of the end wall 23 of the hollow journal. The eye of the interfitting hinge member 18 is also provided with a central opening 27, which communicates with the tubular journal and which permits the tie-rod to be
 40 passed through it and engaged with the end wall of the journal. The outer end 28 of the tie-rod is threaded to receive a nut 29, and it pierces the attachment plate or portion of the proximate outer bearing 11 and the web of
 45 the contiguous outer longitudinal frame bar or member. The nut 29 engages the outer face of such frame bar or member, and the tie-rod maintains the parts in the interlocked relation shown in Fig. 3 of the drawings, the
 50 journal being fitted in the inner end of the tooth-bar and the outer end of the latter being fitted in the annular bearing flange or socket of the outer bearing. This construction also admits of the necessary rotary
 55 movement of the tooth-bar to effect an adjustment of the harrow-teeth 30 and at the same time hinges the sections of the harrow-frame together and permits the same to yield or adjust themselves automatically to the un-
 60 evenness of the land. These harrow-teeth are constructed as shown and described in a copending application filed by me on or about July 29, 1905, Serial No. 271,802.

The rear end of the central frame bar or
 65 member terminates short of and is spaced

from the inner end of the rear tooth-bar, which extends to and slightly beyond the center of the rear portion of the harrow-frame to afford a support for a central rear harrow-tooth 31, which is disposed in longi-
 70 tudinal alinement with the central longitudinal frame bar or member 4. The inner end of the tooth-bar 6 is connected with the rear end of the central frame bar or member by means of a bracket 32, consisting of an at-
 75 tachment portion 33 and an arm 34, extending rearward and laterally from the central frame bar or member to offset the tubular bearing portion from the longitudinal plane of the said member 4. The inner end of the
 80 rear tooth-bar 6 extends inward from the tubular bearing portion of the bracket 32, as clearly illustrated in Fig. 4 of the drawings, and provides a projecting tooth-supporting portion or extension lying immediately in
 85 rear of the central frame bar or member 4. The rear tooth-bar 6 is maintained against longitudinal movement in its bearings by means of a suitable key 35, located contiguous to the bracket 32; but any other suitable
 90 means may be employed for this purpose. The other rear tooth-bar 7 is supported by interlocking hinge elements, one of the elements consisting of a bracket 36 and the other hinge element 37 consisting of an eye
 95 38 and a rearwardly-extending arm or body portion, which terminates in a tubular bearing or socket 39, open at the outer end and having an end wall 40 at the inner end to form an abutment for the inner end of the
 100 rear tooth-bar 7. The bracket 36 is provided with a pair of projecting ears or lugs 41 to receive the pintle, which passes through the eye 38. The attachment plate or portion of the bracket is secured to the central
 105 frame bar or member by means of bolts 42, which also pierce the web of the frame bar or member and the plate or attachment portion of the bracket 32. The rear tooth-bar 7 is retained in the bearing of the hinge element
 110 37 by means of a tie-rod 43, which passes through an opening of the said end wall 40 and which also pierces the web of the frame bar or member 8. The head of the tie-rod engages the end wall, and its nut 44 engages
 115 the frame bar or member.

The sections of the harrow are supported at the outer sides by means of rear wheels 45, mounted on spindles 46 by L-shaped le-
 120 vers 47, consisting of short approximately horizontal arms and long upwardly-extending arms, which terminate in suitable grips or handles 48. These L-shaped operating-levers are fulcrumed at their angles on the
 125 frame bars or members 3 and 8 by means of bolts 49 and are adapted to be oscillated to raise and lower the harrow-frame for adapting the harrow to different conditions of soil. The levers are secured in their adjustment
 130 by bolts 50, which pierce the upright arms of

the levers and which also extend through the perforations 51 of the curved bars 52, mounted on the harrow-frame at opposite sides thereof and having vertical arms 53, which are bolted or otherwise secured to the frame bars or members 3 and 8. The perforations of the arcuate bars 52 are arranged at suitable intervals; but any other form of locking device may be employed for securing the levers and the harrow-frame in their adjustment. The sections of the harrow-frame are also supported by front caster-wheels 54 and a central caster-wheel 55. The front caster-wheels 54 are located at the front frame bars or members 5 and 9, and each wheel 54 is mounted in a forked or bifurcated standard 56, which is adjustably secured to a vertical pivot or stem 57 by means of a bolt 58 and a tooth 59, which engages a ratchet-face 60 of the vertical pivot or stem 57; but any other suitable means may be provided for effecting this adjustment, as will be readily understood.

The pivot or stem 57 is arranged in a vertical bearing or eye 61 of a bearing-bracket 62, which is bolted or otherwise secured to the harrow-frame, as clearly shown in Fig. 6 of the drawings. The vertical stem or pivot 57 is retained in the eye or opening of the bearing-bracket by means of a suitable pin or key 63. The caster-wheel 55 is mounted in a similar manner, and its bearing-bracket is bolted to the central frame bar or member 4 in rear of the intermediate tooth-bars, as clearly shown in Fig. 2 of the drawings. The wheels are adapted to readily pass over all rubbish, and they prevent the same from accumulating in front of and being carried forward by the harrow, and in order to afford a maximum clearance capacity at the center of the harrow the longitudinal bar or member 4 is provided between the tooth-bars with upwardly-extending arched portions 64. All parts which might tend to obstruct the free passage of rubbish through the harrow are eliminated at the center, and this, together with the employment of the central wheel and the arched portion 64, greatly increases the clearance capacity of the harrow. The sections of the harrow-frame are independently supported by the caster and side wheels, which do not interfere with the operation of the hinge connection between the sections of the harrow-frame.

The tooth-bars are adjusted by means of levers 65, suitably fixed to the rear tooth-bars and connected with the intermediate front tooth-bars by means of longitudinal bars 66 and arms 67, which extend upward from the said tooth-bars. The connecting-bars 66 also carry toothed segments or ratchets 68, which are arranged to be engaged by spring-actuated dogs or detents 69 of the operating-lever 65. Any other suitable means, however, may be employed for rotating the

tooth-bar to adjust the harrow-teeth, and the latter may be of any desired number, and any preferred arrangement of the harrow-teeth may be employed.

The front frame-bars 5 and 9 are provided with eyes 70 or other suitable means for the connection of a draft attachment.

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

1. A sectional harrow including flexibly-connected rigid side frames, one only of said frames having an inner longitudinal bar, said bar constituting the sole central member of the harrow-frame, and tooth-bars extending between the central member and the outer bars of the side frames, the tooth-bars at one side of said member being flexibly connected thereto independently of the connection between the side frames.

2. A sectional harrow including a substantially U-shaped side frame, a second side frame of approximately L shape, a hinge connection between the inner extremity of the front bar of the L-shaped frame and the inner bar of the U-shaped frame, tooth-bars extending across the U-shaped frame, and other tooth-bars extending from the outer bar of the L-shaped frame and hinged to the inner frame member independently of each other and of the connection between the frames.

3. A sectional harrow comprising side frame-sections one only of which includes an inner frame-bar, said bar constituting the sole central member of the harrow-frame, a series of tooth-bars at each side of the central member, and hinge connections between the side frames and between the central member and the tooth-bars of one series, all of said hinge connections being located in the horizontal plane of the harrow-frame.

4. A sectional harrow comprising side frames, one including rigidly-connected inner and outer side bars and a front bar, and the other comprising an outer side bar and a front bar exclusively, the several bars of the harrow-frame being normally located in the same horizontal plane, a series of tooth-bars located at each side of the inner frame-bar, a hinge connection between the side frames, other hinge connections between the inner frame-bar and one series of tooth-bars, all of said connections being located in the horizontal plane of the harrow-frame, and independent supporting means for the respective sections of the harrow.

5. A sectional harrow comprising a sectional frame having a single central member, the sections of said frame being flexibly connected, means for supporting harrow-teeth at opposite sides of the central member, and tooth-supporting means in the line of said member.

6. A sectional harrow including hingedly-

connected frame-sections one only of which has an inner member, said member constituting the sole central member of the harrow-frame, and several rows of harrow-teeth extending across the harrow-frame, those portions of the central member extending between the rows of teeth being longitudinally arched.

7. A sectional harrow including outer frame members for the individual sections, and an inner member common to both sections, said sections being flexibly connected, wheels spaced from the inner frame member for supporting the harrow-sections, and a wheel for supporting the inner frame member.

8. A sectional harrow composed of independently-supported sections including a longitudinal member constituting the inner frame member of both sections and extending from the front to the back of the harrow, said sections also including outer frame members, one of which is rigid with the said longitudinal member, and the other being hinged to the same, tooth-bars extending between the longitudinal member and the outer frame members, the said longitudinal member terminating short of the rear tooth-bars of both sections, and one of said rear tooth-bars being extended in rear of the longitudinal member, a harrow-tooth mounted on the extended portion of the tooth-bar, and means for supporting the inner ends of the rear tooth-bars.

9. A sectional harrow including inner and outer frame members, the inner frame member being common to both sections and rigidly connected with one of the outer frame members, tooth-bars journaled on the other outer frame member, and interfitting hinge elements connecting the tooth-bars to the inner frame member, one of the elements consisting of a bracket secured to the inner frame member and having projecting ears, and the other element having an eye and provided with a tooth-bar-receiving journal.

10. A sectional harrow including an inner frame member, opposite tooth-bars, a bearing receiving one of the tooth-bars and provided with an attachment portion, a bracket having projecting ears, a fastening device piercing the bracket, the inner frame member and the attachment portion of the bearing, and a hinge element pivoted between the projecting ears and having a journal receiving the other tooth-bar.

11. A sectional harrow including an inner frame member, a tooth-bar, a bracket having projecting ears, a hinge element provided with a tubular journal to receive the tooth-bar and having an eye arranged between the ears of the bracket, and a pintle passing through the eye and the ears.

12. A sectional harrow including an inner frame member, a bracket mounted on the

said member and having projecting ears, a hinge member pivoted between the ears and provided with a projecting journal, a tubular tooth-bar fitted on the journal, and a tie-rod passing through the tooth-bar and detachably interlocked with the hinge element for retaining the tooth-bar on the journal.

13. A sectional harrow including an inner frame member, a tooth-bar, a bracket having projecting ears or lugs, a hinge element fitting between the ears and provided with a tubular journal receiving the tooth-bar, a pintle connecting the hinge element to the ears, and a tie-rod interlocked with the tubular journal and securing the tooth-bar to the same.

14. A sectional harrow including outer frame members, an inner frame member common to both of the sections, the latter being flexibly connected, spaced bearings connected with and located in rear of the inner frame member, rear tooth-bars mounted in the said bearings, one of the tooth-bars being extended in rear of the inner frame member, and a centrally-arranged rear tooth mounted on said extended tooth-bar and arranged in the same longitudinal plane as the inner frame member.

15. A sectional harrow including outer frame members, an inner frame member common to both sections of the harrow, said sections being flexibly connected, tooth-bars carried by the sections of the harrow, one of the tooth-bars being extended in rear of the inner frame member, and a centrally-arranged rear tooth mounted on the extended portion of such tooth-bar and disposed in the same longitudinal plane as the inner frame member.

16. A sectional harrow embodying an inner frame member, a hinge connection mounted on the said member at the rear end thereof and provided with an arm extending laterally and rearwardly from one side of the inner frame member and having terminal bearing, a fixed arm extending rearwardly and laterally from the opposite side of the inner frame member and having a terminal bearing, opposite tooth-bars having their transverse ends arranged in the said bearings, one of the tooth-bars being extended in rear of the inner frame member to form a support for a central harrow-tooth.

17. A sectional harrow including an inner frame member, a hinge connection having an oscillatory hinge element extending rearwardly and laterally from one side of the said member and provided with a terminal bearing closed at the inner end, a fixed arm extending from the opposite side of the said member and having an open bearing arranged in spaced relation with the closed end of the said bearing, tooth-bars arranged in the said bearing, the tooth-bar of the open bearing being extended in rear of the frame

member to form a support for a harrow-tooth.

18. A sectional harrow including an inner frame member, a hinge connection having an oscillatory hinge element extending rearwardly and laterally from one side of the said member and provided with a terminal bearing closed at the inner end, a fixed arm extending from the opposite side of the said member and having an open bearing arranged in spaced relation with the closed end of the said bearing, tooth-bars arranged in the said bearing, the tooth-bar of the open bearing being extended in rear of the frame members to form a support for a harrow-tooth, and a tie-rod piercing the closed end of the bearing and securing the tooth-bar within the latter.

19. A sectional harrow composed of independently-supported sections including a longitudinal member constituting the inner frame member of both sections and extending from the front to the back of the harrow,

said sections also including outer frame members, one of which is rigid with the said longitudinal member, and the other being hinged to the same, tooth-bars extending between the longitudinal member and the outer frame members, the said longitudinal member terminating short of the rear tooth-bars of both sections, and one of said rear tooth-bars being extended in rear of the longitudinal member, a harrow-tooth mounted on the extended portion of the tooth-bars, and arms extending rearwardly from the longitudinal member and laterally offset from each other to clear the said harrow-tooth, and provided with terminal bearings to receive the inner ends of the rear tooth-bars.

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

JAMES M. ULSH.

Witnesses:

PERCY L. CARPENTER,
MILTON H. HARTMAN.