

J. M. ULSH.
HARROW.

APPLICATION FILED JULY 11, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

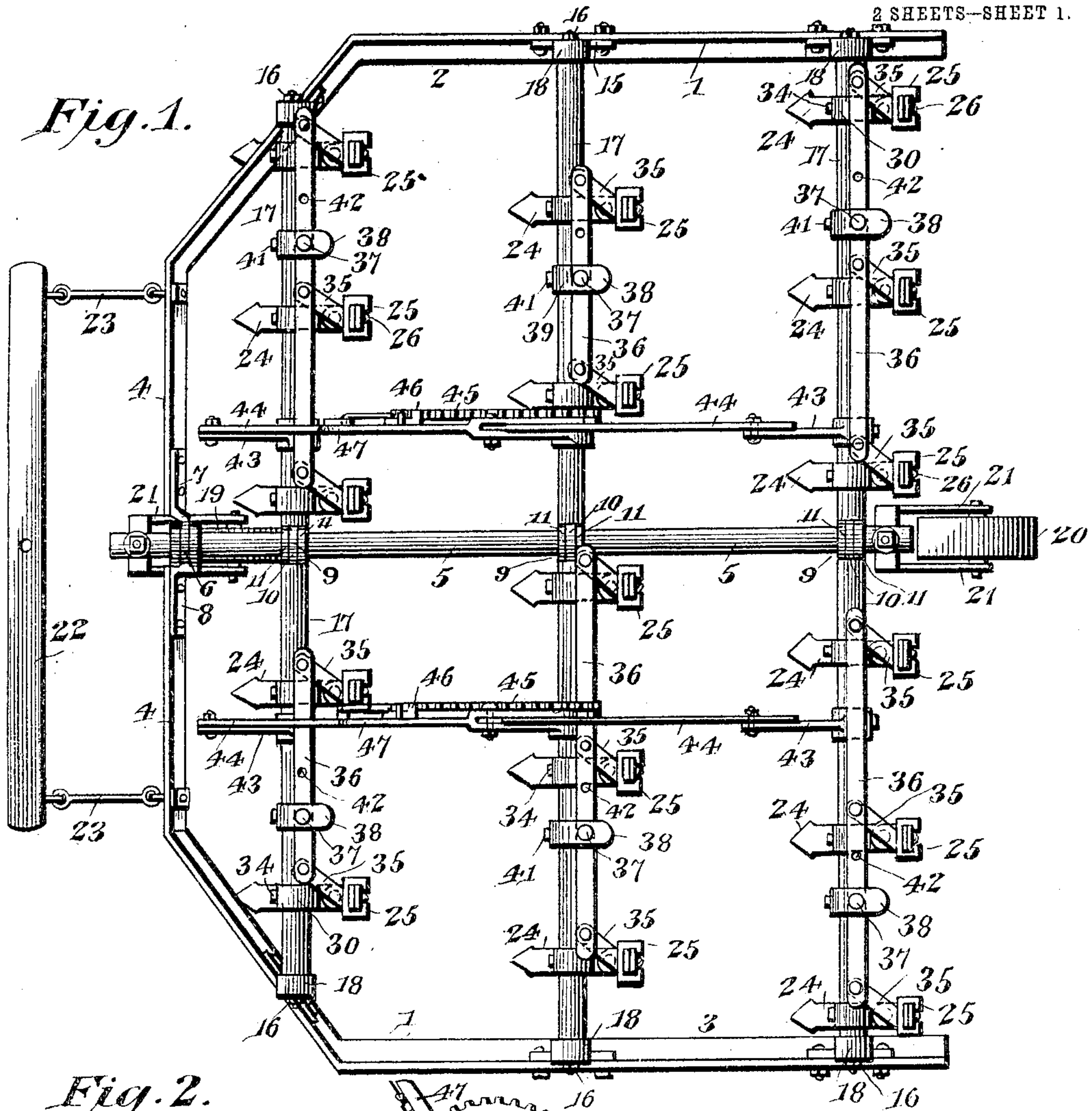
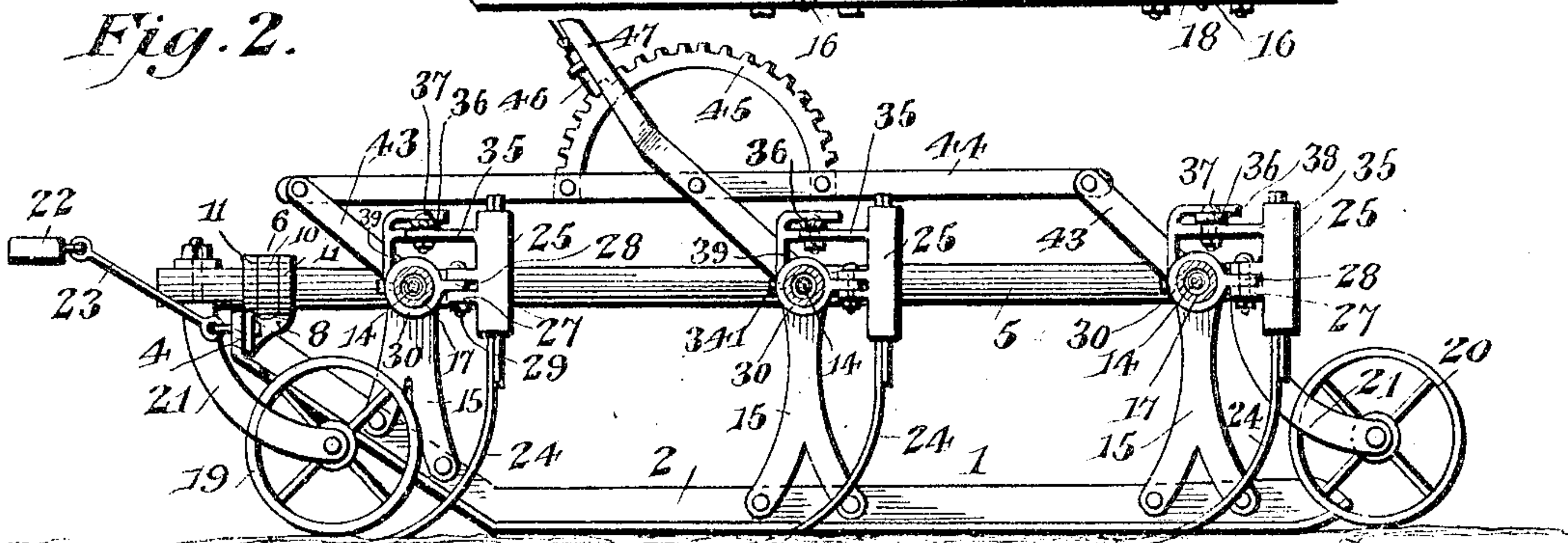


Fig. 2.



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J. M. ULSH.
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2 SHEETS—SHEET 2.

Fig. 3.

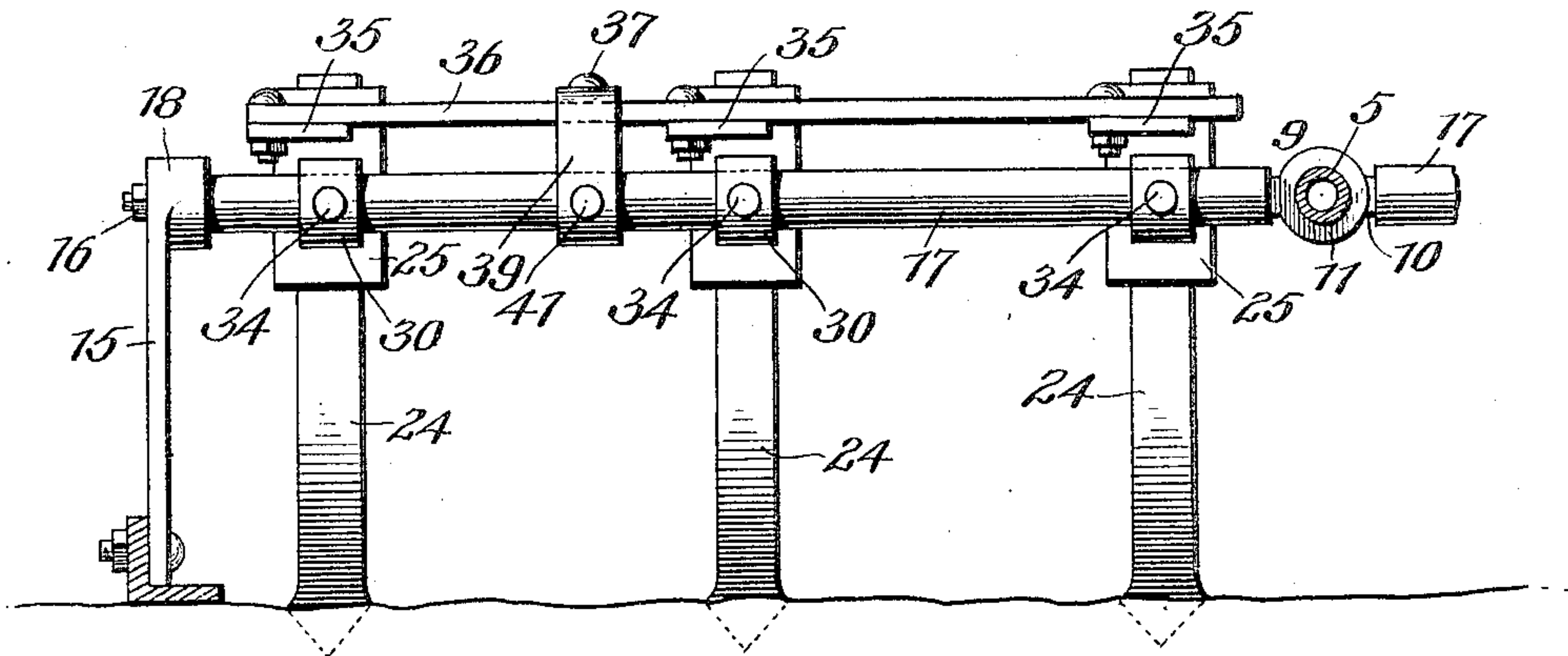


Fig. 4.

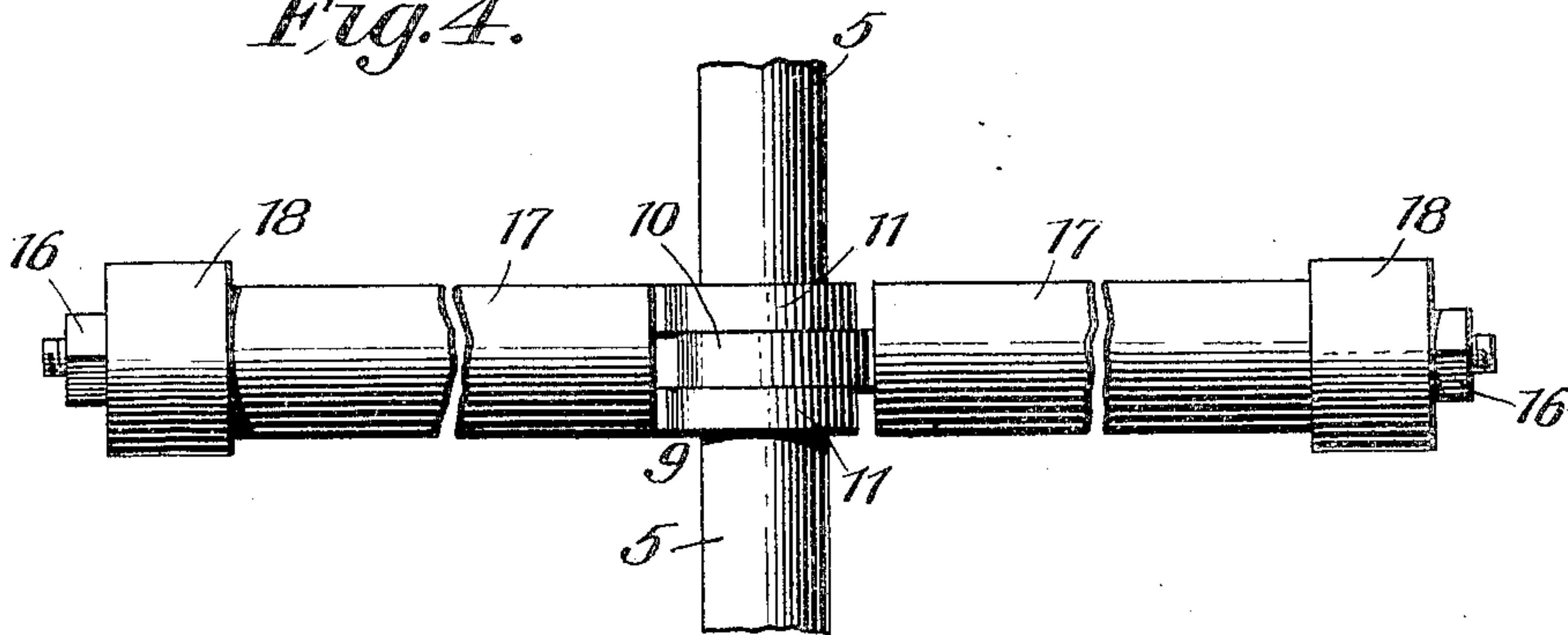
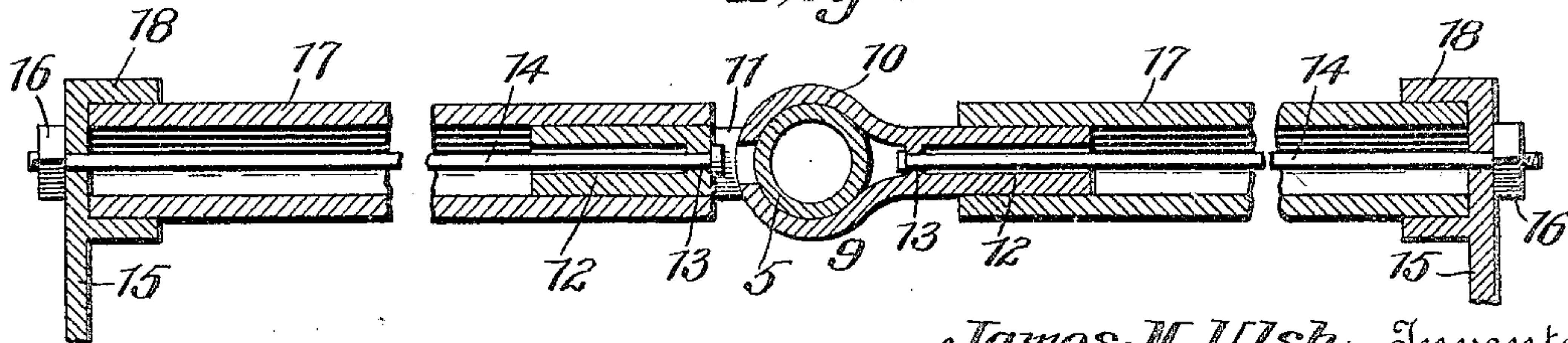


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES M. ULSH, OF LANCASTER, PENNSYLVANIA.

HARROW.

No. 804,781.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed July 11, 1904. Serial No. 216,128.

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.

My present invention relates to a novel harrow of what is known as the "spring-tooth lever" type. Harrows of this class are constructed so that the sides or sections of the harrow may accommodate themselves to any unevenness of the land and ride freely over obstructions. Ordinarily each harrow-section is equipped with runners and tooth-bars carrying teeth, the latter being adjustable to regulate the depth of cut. Heretofore several objections have been urged against these harrows, the principal ones being that the arrangement of runners and connecting parts obstructs the free passage of rubbish through the harrow and causes it to accumulate in a manner interfering with the proper operation of the implement; also that the various connections are not of durable character.

Having in mind these several objections and others concerning structural details, my invention has for its primary object to produce a spring-tooth-lever harrow of simple, durable, and inexpensive construction which will have a maximum clearance for the passage of rubbish therethrough.

Another object is to improve the hinge connection between the harrow-sections in a manner to eliminate the usual bridge and its complementary castings by providing a central frame member carried by the central supporting means and constituting an element of the hinge connection between the relatively movable sections or sides of the implement.

A further object is to improve the mountings of the tooth-bars.

Other objects of the invention subordinate to those enumerated will appear during the course of the succeeding description of that embodiment of the invention which for the purpose of this disclosure is illustrated in the accompanying drawings and succinctly defined in the appended claims.

In said drawings, Figure 1 is a plan view of my harrow with the teeth arranged directly across the line of draft. Fig. 2 is a side elevation thereof. Fig. 3 is a sectional elevation of a portion of the harrow. Fig. 4 is a detail view showing two tooth-bars, their bearings, and their hinge connection with the

central frame; and Fig. 5 is a vertical sectional view of the subject-matter of Fig. 4.

Like numerals are employed to designate corresponding parts throughout the views.

1 indicates an angle-iron runner-frame comprising runners 2 and 3, connected by a front frame-bar 4, divided at its center and having its opposite ends inclined, as shown, for the purpose of elevating the front of the runner-frame sufficiently to allow considerable clearance under the latter. At the longitudinal center of the harrow is located what I will term a "central" frame-bar 5, preferably of tubular form and constituting the pintle of a hinge 6, constituting a flexible connection between the opposite sides or sections of the runner-frame and composed of interfitting hinge elements 7 and 8, encircling the bar 5 and secured, respectively, to the sections of the bar 4. At intervals along the bar 5 are located hinges 9, each of which includes a pair of interfitting hinge elements 10 and 11, encircling the bar 5 and each having formed integral therewith a short cylindrical journal 12, extending laterally from the central frame-bar. These journals 12 have their proximate ends closed by apertured heads 13, which accommodate the inner headed ends of tie-rods 14, the outer ends of which are passed through vertical standards 15, having bifurcated lower ends bolted or otherwise secured to the runner-frame. Nuts 16 are screwed upon the outer ends of these tie-rods 14, which latter thus serve, in connection with the hinge elements 10 and 11, to connect the central bar 5 of the frame with the standards upstanding from the runners.

The tooth-bars 17 are in the form of hollow tubes extending from the hinges 9 to the standards 15 and inclosing the tie-rods and journals. In fact, the tooth-bars are rotatably supported at their inner ends upon the journals 12, and their outer ends are received within annular bearing-flanges 18, extending inwardly from the standards 15 at the upper ends thereof and concentric with the tie-rods. Thus it will be seen that the sides or sections of the harrow are hinged to the central frame-bar 5, which constitutes the pintle of the hinge connection, and that each section includes a runner at its outer edge and a series of independently-rotary tooth-bars located at a sufficient elevation to provide an effective clearance.

It is necessary to provide a central support of some character for the harrow thus con-

constructed, and while this may be in the form of a runner supporting the bar 5 I prefer to provide front and rear caster-wheels 19 and 20, mounted in wheel-frames 21, secured to and supporting the opposite ends of the tubular bar 5, as shown in Fig. 2. These wheels while affording ample support for the middle portion of the harrow afford no obstruction to the free passage of the harrow over rubbish or obstructions. The draft appliance 22 is connected to the front end of the runner-frame, as usual, by means of links 23, connected to the bar 4 at similar distances from the center of the harrow.

Upon each of the tooth-bars 17 is mounted a series of harrow-teeth 24, which are designed to be elevated and depressed and to be adjusted laterally for the purpose of disposing them across the line of draft edgewise thereto or at an intermediate angle, as described in my copending application, Serial No. 235,681, for United States Letters Patent. In addition to this adjustment I provide means whereby all of the teeth of each side or section of the harrow may be simultaneously elevated or depressed, this end being attained by swinging the teeth from horizontal axes, or, in other words, by the rotation of the several tooth-bars. To effect this latter adjustment, each set of tooth-bars—to wit, the bars at each side of the harrow—are equipped with radial arms 43, connected by a bar 44, carrying a toothed segment 45, arranged to be engaged by the latch 46, carried by a tooth-adjusting lever 47, preferably formed by elongating one of the arms 43, as shown in Fig. 2. During the harrowing the depth of cut may be easily regulated by the manipulation of the levers 47, according to the hardness of the particular ground being worked and the depth of cut desired.

It will now be seen that the harrow is characterized by spring-teeth so mounted upon elevated tooth-bars extending in opposite directions from a single suitably-supported central frame-bar that a maximum clearance permitting the free passage of the harrow over rubbish and obstructions will be secured. It is obvious, however, that instead of the casters 19 and 20 the central frame bar or member 5 may be supported by a single runner, and it is equally apparent that viewed in certain aspects the invention would comprehend the employment of wheels in lieu of the runners 2 and 3, since the harrow is possessed of many meritorious features regardless of the particular character of the side and central supports of the harrow-frame.

It is thought that from the foregoing the construction and operation of my harrow and the many advantages accruing therefrom will be clearly comprehended; but while the present embodiment of the invention appears at this time to be preferable I wish to be distinctly understood as reserving the right to

effect such changes, modifications, and variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is—

1. A sectional harrow, including a longitudinal member constituting the inner frame-bar of both sections, said sections including outer frame-bars hinged to the longitudinal member and tooth-bars extending between the longitudinal member and the outer frame-bars, said longitudinal member and the outer bars of the frames being independently supported from the ground.

2. A sectional harrow, including a longitudinal member constituting an inner frame-bar common to both sections, outer frame-bars having connection with the longitudinal member and vertically movable independently thereof, and tooth-bars extending across each section of the harrow and mounted to swing from the central member as an axis, and means for supporting the central member from the ground independently of the other members of the frame.

3. A sectional harrow, including a central member constituting an inner frame-bar common to both sections, other frame members constituting portions of the respective sections and hinged to the central member, means for supporting the central member from the ground independently of the other frame members, tooth-bars having their inner ends sustained above the ground by the central member and mounted to swing from the latter as an axis, and tie-rods connecting the outer frame members of the harrow-sections with the central longitudinal member to retain the various elements of the frame in their proper relative positions.

4. A sectional harrow comprising outer frame members for the sections, an inner member supported independently of the outer members and constituting the inner frame-bar of both sections of the harrow, tooth-bars extending across the respective sections of the harrow and mounted to swing vertically with the outer frame members from the central member as an axis, the inner ends of the tooth-bars and the central frame member being disposed normally in substantially the same horizontal plane.

5. A sectional harrow, including outer frame members for the individual harrow-sections, and an inner member common to both sections, the several frame members being independently supported from the ground and flexibly connected to each other.

6. A sectional harrow, including outer frame members for the individual harrow-sections, an inner member common to both sections, the several frame members being independently supported from the ground and flexibly connected to each other, and rotary tooth-bars extending in opposite directions from the cen-

tral frame member and having their axes in intersecting relation therewith.

7. A sectional harrow, including outer frame members for the individual harrow-sections, an inner member common to both sections, the several frame members being independently supported from the ground and flexibly connected to each other, journals extending in opposite directions from the central frame member and hinged thereto, and rotary tooth-bars mounted on the journals with their axes in intersecting relation with the central member and supported at their outer ends by the outer frame members.

8. A sectional harrow, including outer frame members for the individual harrow-sections, an inner member common to both sections, the several frame members being independently supported from the ground and flexibly connected to each other, tie-rods connecting the inner and outer members of the frame, and rotary tooth-bars surrounding the tie-rods and having their axes in intersecting relation with the central member.

9. A sectional harrow, including outer frame members for the individual harrow-sections, an inner member common to both sections, the several frame members being independently supported from the ground and flexibly connected to each other, journals hinged to and extended in opposite directions from the central frame member, standards rising from the outer frame members and formed with journals, tie-rods extending from the standards to the journals on the inner frame member, and rotary tooth-bars surrounding the tie-rods and supported at their opposite ends by the inner and outer journals.

10. A sectional harrow, including a central longitudinal member constituting the inner frame-bar of both sections, outer frame members having hinged connection with the inner member at the front end only of the latter, and tooth-bars having hinged connection with the inner frame member at various points in the length thereof and supported at their outer ends by the outer frame members.

11. A sectional harrow, including outer frame members for the individual harrow-sections, an inner member common to both sections, the several frame members being independently supported from the ground and flexibly connected to each other, journals hinged to the central frame member and having interfitting hinge elements, and rotary tooth-bars mounted on said journals.

12. A sectional harrow, including a longitudinal member constituting an inner frame-bar common to both sections, outer frame members for the sections, journals carried by the inner and outer frame members, and hollow tooth-bars carried by the journals.

13. A sectional harrow, including a longitudinal member constituting an inner frame-bar common to two sections, an outer frame-

bar for each section, journals hinged to said longitudinal member and extending in opposite directions therefrom, standards rising from the outer frame members, and tooth-bars supported at their inner ends by the journals and at their outer ends by the standards.

14. A sectional harrow, including two sections, an inner frame member common to both sections, an outer frame member for each section, tie-rods connecting the outer frame members to the inner frame member, and a set of tooth-bars for each harrow-section, said tooth-bars being carried at their inner and outer ends by the inner and outer frame members of the section.

15. A sectional harrow, including a longitudinal bar constituting an inner frame member common to two harrow-sections, an outer frame member for each section, journals extending from said longitudinal bar, tie-rods extending from the journals to the outer frame members, and tooth-bars mounted on the journals and inclosing the tie-rods.

16. A sectional harrow, including a longitudinal bar constituting an inner frame member common to two harrow-sections, inner journals hinged to said member, an outer frame member for each section, outer journals carried by the outer frame members, tie-rods connecting the inner and outer journals, and tooth-bars carried at their opposite ends by the inner and outer journals and inclosing the tie-rods.

17. A sectional harrow, comprising a longitudinal bar constituting an inner frame member common to two sections, an outer frame member for each section, standards rising from the outer frame members and provided with bearing elements, journals hinged to the inner frame member, tie-rods connecting the journals with the standards, and hollow tooth-bars rotatably supported at their inner ends by the journals and at their outer ends by the bearing elements on the standards and inclosing the tie-rods.

18. A sectional harrow, including two sections, an inner frame member common to both sections, an outer frame member for each section, two sets of tooth-bars, each set extending from the inner frame member to one of the outer frame members, and means for effecting the individual support of the inner frame member from the ground, to insure the maintenance of said member in proper position while permitting independent vertical movement of the other elements of the respective harrow-sections to accommodate inequalities in the surface of the ground.

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:

EDW. GERLACH,

J. SCOTT HICKY.