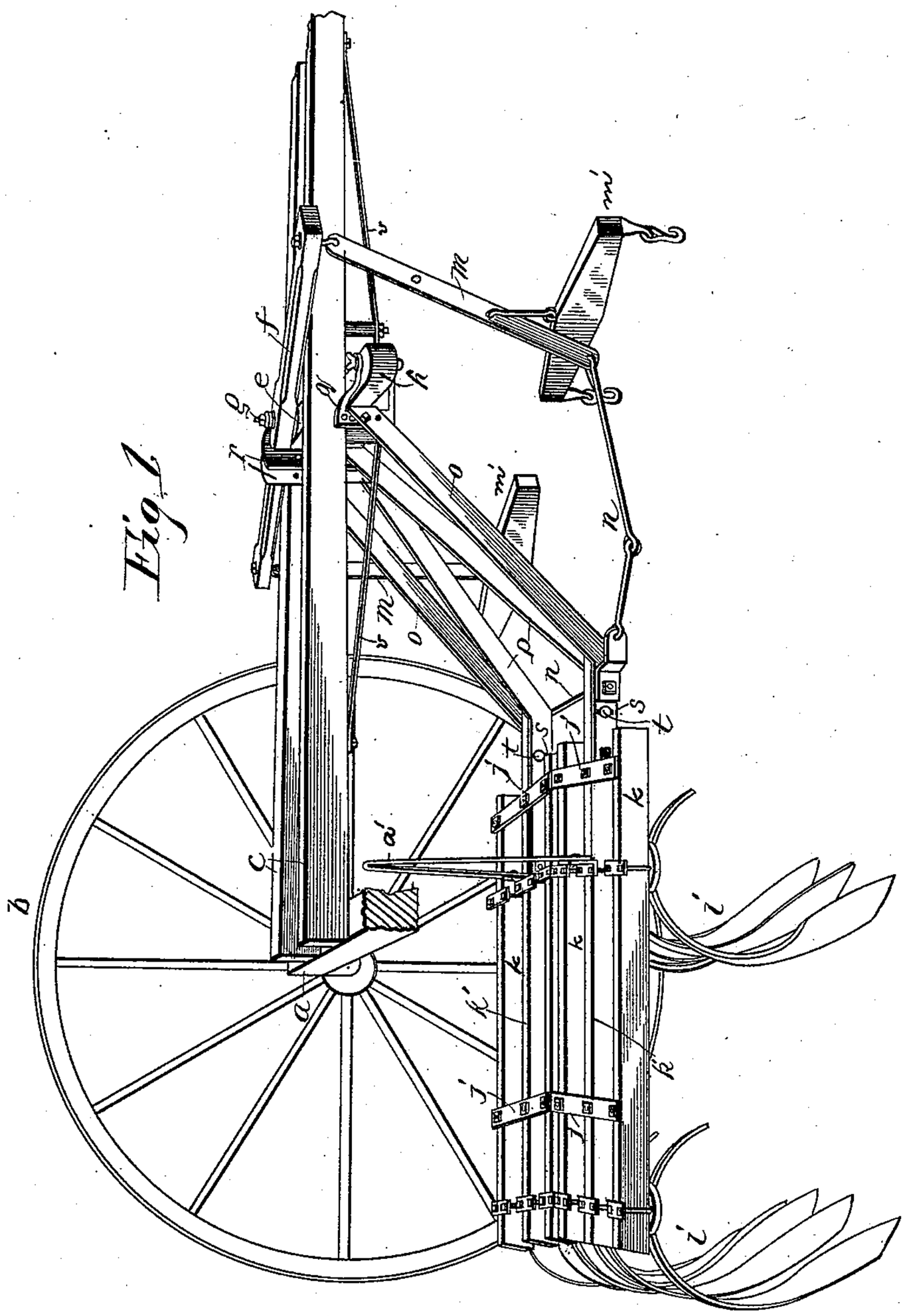
(No Model.) 3 Sheets—Sheet 1.

E. E. WHIPPLE.

HARROW.

No. 464,345. Patented Dec. 1, 1891.

Fig. 1.



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(No Model.)

3 Sheets—Sheet 2.

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HARROW.

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Fig 2

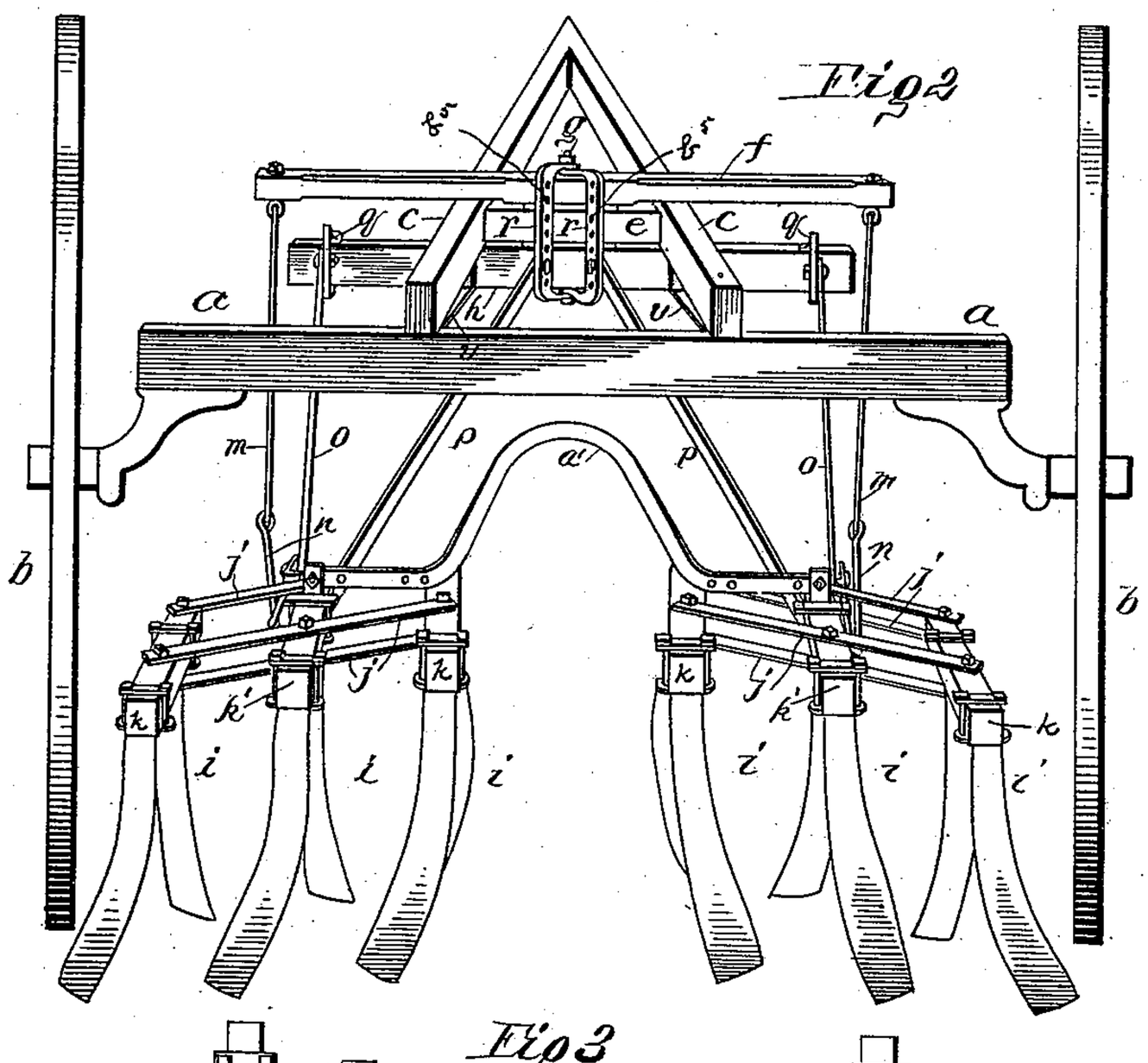


Fig 3

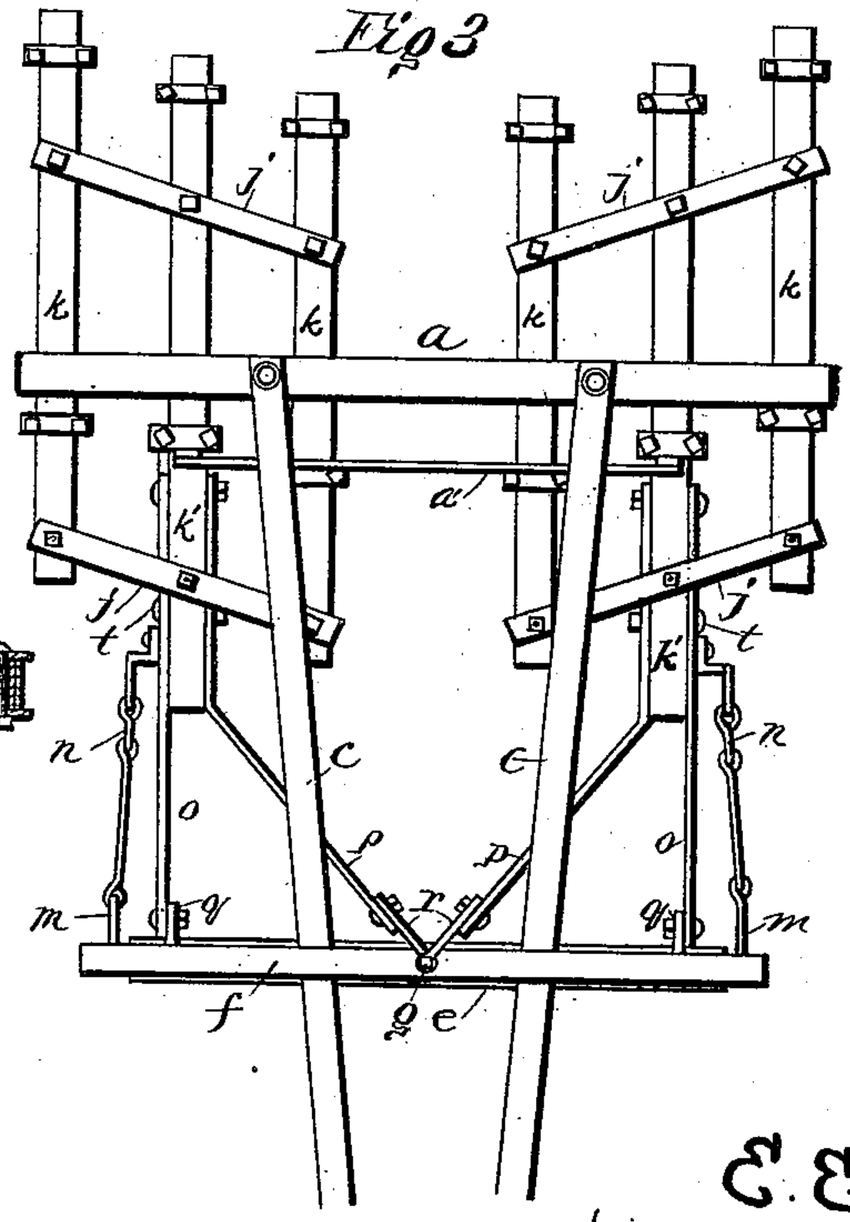


Fig 4

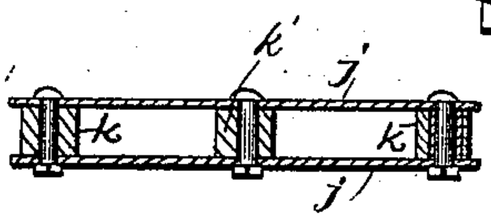
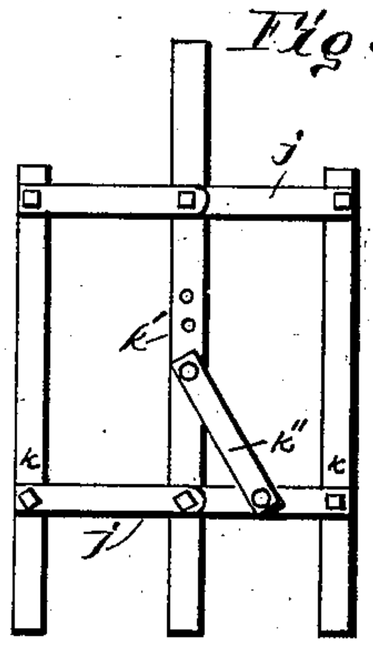


Fig 5



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(No Model.) 3 Sheets—Sheet 3

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HARROW.

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Fig. 6.

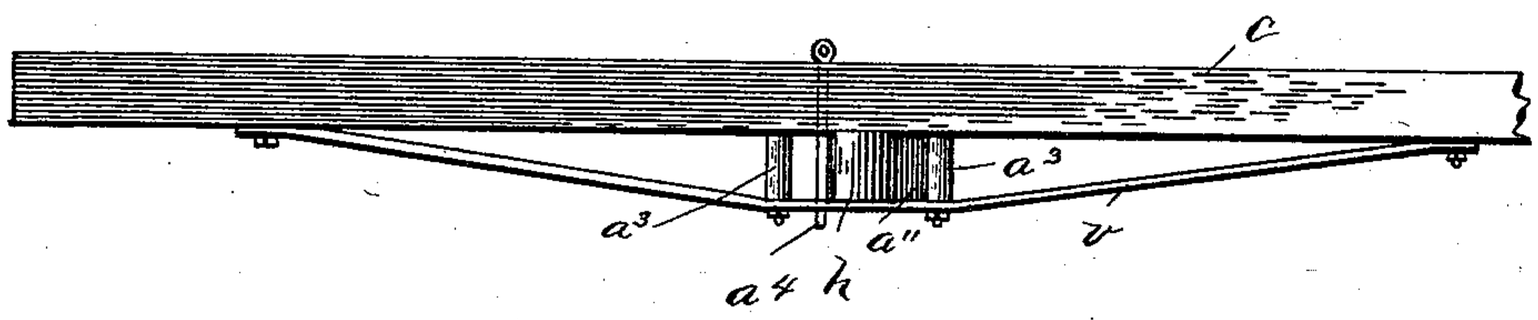


Fig. 7.

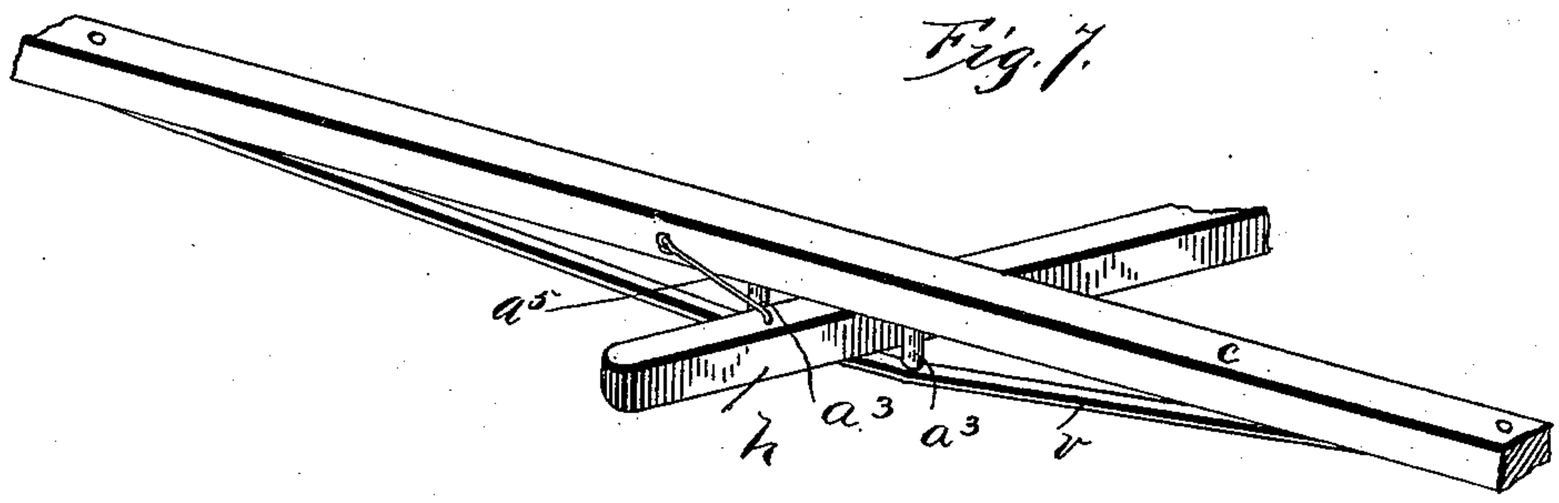


Fig. 8.

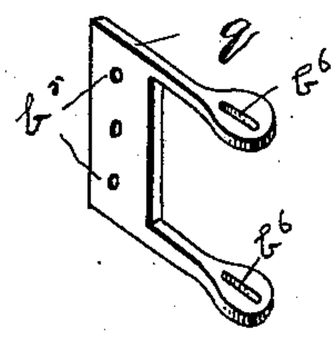
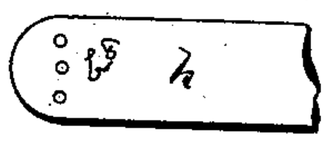


Fig. 9.

Fig. 10.

Fig. 11.



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UNITED STATES PATENT OFFICE.

EFFINGER E. WHIPPLE, OF ST. JOHN'S, MICHIGAN.

HARROW.

SPECIFICATION forming part of Letters Patent No. 464,345, dated December 1, 1891.

Application filed December 9, 1890. Serial No. 374,030. (No model.)

To all whom it may concern:

Be it known that I, EFFINGER E. WHIPPLE, of St. John's, 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 cultivators; and the invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a perspective of the cultivator with portions broken away. Fig. 2 is a rear view. Fig. 3 is a top plan with portion broken away. Figs. 4, 5, 6, 7, 8, 9, 10, and 11 are views of details.

The objects of the invention are to provide an improved manner of attaching the draft and coupling the harrow-sections; to provide improved constructions whereby the harrow-sections can be varied in width laterally to vary the distance between the same and can be locked in the varied adjustments for various kinds of work; also, to provide improved manner of coupling the harrow-sections to the frame so as to steady and prevent rolling and rocking of the same and to hold them in the desired position; also, to provide means whereby each section can level itself by having limited independent vertical play, and also to provide certain improved details of construction.

In the drawings, the reference-letter *a* indicates the axle carried by wheels *b b*.

c is the tongue or frame mounted on the axle, and preferably consisting of the two beams secured together at their front ends and at their rear ends a distance apart on the axle. The axle also carries the seat. (Not shown.) *e* is a cross-bar rigidly secured to said beams, forming the tongue. *f* is the doubletree located transversely above said tongue and at its center pivoted to swing horizontally by a pivot-bolt *g*, passed down through the doubletree, cross-bar *e*, and a horizontal swinging beam *h* on the under side of tongue *c* and extending laterally beyond the sides thereof. The harrow-sections are connected to and swing with this bar.

Two harrow-sections are usually and preferably employed, although a greater number can be used, if desirable. Each harrow-section consists of, preferably, three parallel harrow-beams *k*, extending in the line of movement and carrying the harrow or cultivator teeth *i* and pivotally joined together by the parallel metal cross-links *j*, pivoted at their centers to swing on center beam *k'* and at their outer ends to the two side beams, so that the width of the section can be increased or diminished, after the principle of parallel-rulers, by moving the two side beams longitudinally, while the center beams remain stationary and always parallel with the side beams. By this means the distance between the two harrow-sections can be increased or diminished for various kinds of work, and the beams of each section can be locked at their various adjustments in any suitable manner, as by tightening a bolt at one of the joints, (see Fig. 4,) or by a chain, or by having a hooked rod *k''* to engage the center beam and one of the cross-beams, as will be readily understood from Fig. 5.

A vertical hanger *m* depends from each end of the doubletree in front of the respective harrow-sections, and each hanger is so secured to an end of the doubletree that its lower free end can swing in the line of draft, and said lower end of each hanger is connected by the flexible or loose draft connections *n* with a clevis or plate on the front end of the center beam of the harrow-section directly in rear of the respective hangers. The two whiffletrees *m'* on opposite sides of the tongue are centrally and loosely hung on said hangers near the lower ends thereof.

The two harrow-sections are coupled together and to the frame by swinging coupling bar or beam *h*, pivoted as before described, and a distance in front of the axle or support for the rear end of the tongue. Each harrow-section is secured to said beam by the rigid coupling braces or bars *o p* at their lower ends, secured on opposite sides of the

front end of beam k' of the respective section. The bars o, secured to the outer sides of said outer beams, extend up to the respective outer ends of the swinging coupling-beams and are secured thereto by the clevises q, pivoted to the beam ends to swing laterally. The two bars p, secured to the inner sides of said center beams, extend upwardly and inwardly to the central portion of said beam, and are there pivotally secured by the two swinging clevises r r, both preferably mounted on the one pivot-bolt g, before described. By this arrangement the coupling-bars are spread at their upper ends, and hence hold the harrow-sections against rocking or swinging laterally, except to a very limited extent.

If desirable, the coupling-braces at their lower ends can be pivoted to the sides of the tooth-beams to allow the harrow-sections independent vertical swing. At a distance forward of their rear ends said braces can be provided with elongated vertical or transverse slots s, in which pins t, secured to the front ends of the tooth-beams, work. By this construction the harrow-sections can conform independently and easily to the surface of the ground and level themselves, while their swing is limited by the slot and pin. The harrow is not necessarily provided with this leveling construction, and hence I do not limit myself to its use in this machine.

By reason of the arrangement of coupling-braces and swinging coupling-beam both harrow-sections and the coupling-beam swing laterally together and from a common center.

v v are metal truss rods or bars longitudinally secured on the under sides of the two beams of the tongue, and on which the ends of the swinging coupling-beam rest and move beneath the tongue-beams, as clearly shown. These trusses also strengthen the tongue and prevent warping thereof.

a' is the yoke ordinarily employed in straddle-row cultivators or harrows to steady and render the harrow-sections more rigid and hold them the desired distance apart and relieve the couplings of excessive strain. This yoke has series of bolt-holes in its ends, so that the harrow-sections can be secured at various distances apart. The invention is not confined to the use of this yoke a'.

The many and great advantages of this tool are obvious. The tool can be quickly and easily changed from an ordinary field cultivator or harrow to a straddle-row cultivator for working up corn or other crops by merely narrowing up the sections, as before described, and thereby widening the space between the sections, and the sections can be swung laterally to conform to unevenness of the rows, the two sections swinging from a common center, and the sections can be set at angles to each other—that is, their rear ends can be drawn closer together than their outer ends and thus obtain an increased action on the surface of the soil. When the tool is to be used as an ordinary field cultivator or harrow, the sections are unlocked and expanded and the swinging coupling-beam is preferably locked, so that the sections cannot swing laterally into the wheels. The metal strips or links j can, if desirable, be formed in sections (see Fig. 5) and pivoted, respectively, to the side beams, instead of each in one piece extending across all of the harrow-beams of a section. The harrow-sections are kept from rocking by spreading the coupling braces or bars o p at their upper ends, as before mentioned, which holds the braces or bars against twisting or turning. This is an important feature, and also coupling the harrow-sections to the swinging bar h is a feature of great importance, possessing many advantages. The tongue or frame of the machine is supported at the rear end by the axle, and the harrow-sections are loosely coupled with this tongue at a point a distance in advance of the support for its rear end by the bar h and rigid coupling-braces extending downwardly and rearwardly to the harrow-sections. Hence the harrow-sections hold up and support the front end of the tongue or frame through the medium of said braces and bar, and the sections are held to the ground by the tongue or frame. By reason of the peculiar manner of attaching the draft directly to the sections when the draft is applied to the sections they are drawn forward, thereby lifting the tongue through the medium of the coupling devices and taking the weight from the necks of the horses. The trussed beams of the tongue are another important feature. These truss bars or rods not only strengthen and prevent the tongue from warping, but form rests or supports for the swinging coupling-bar. This bar h can be locked in various ways to hold the sections against lateral swing—such as by a block a'', inserted between the bar h and one of the stops a^3, or a bolt a^4 can be employed, or a swinging hook a^5, as shown in Figs. 6 and 7.

By reason of the peculiar manner of coupling the harrow-sections they can be leveled transversely by raising or lowering either coupling-brace o or p. Hence clevises attaching the coupling-braces to the coupling-beam are provided with the vertical series of apertures b^5, so that the upper ends of said braces can be independently raised and lowered and secured in the desired adjustment.

The sections of ordinary straddle-row cultivators are drawn together or spread by the yoke a'; but the sections of this tool cannot be thus drawn together or moved apart without providing means to correspondingly vary the length of the coupling-braces. This can be done in many ways, as by slots b^6 in the outside clevises, Fig. 8, so as to allow the distance between ends of bar h and the sections to be varied, or the same can be accomplished by longitudinal slots b^7 in the braces, Fig. 9, or the braces can be made in sections, Fig. 10, arranged to telescope or slide longitudinally on each other, or horizontal series of holes in the ends b^8 of bar h, Fig. 11, can be

provided for this purpose. These modifications are illustrated in detail in Figs. 8, 9, 10, and 11.

It is evident that various changes or modifications might be resorted to in the form and arrangements of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the construction herein set forth, but consider myself entitled to all such modifications. Of course this invention is applicable to harrows and cultivators.

What I claim is—

1. In a wheeled harrow, the combination of the tongue or frame and an axle and wheels or other support for the rear end thereof, the harrow-sections, the horizontal swinging coupling-beam pivoted to the tongue or frame forward of said rear end support and to which the sections are coupled so as to swing together and from a common center, and the draft attachments, substantially as described.

2. In combination, a wheeled frame, two or more harrow-sections, a centrally-pivoted horizontal swinging coupling-beam carried by said frame, and coupling-braces from each section to the center and end of said beam.

3. In combination, a harrow frame or tongue, the horizontal centrally-pivoted coupling-beam, laterally-swinging clevises at the center and ends thereof, the two harrow-sections, a rigid coupling-brace from each harrow-section to said center clevises, and a coupling-brace from each harrow-section to an end clevis, substantially as described.

4. The combination of the wheel-supported and trussed tongue, the pivoted doubletree, the centrally-pivoted coupling-beam between said trusses and said tongue, the harrow-sections coupled to said beam to swing therewith, and whiffletrees suspended from said doubletree and connected with said sections, as set forth.

5. The combination, with the frame or tongue and a harrow-section, of a coupling-brace at its ends pivotally connected to said beam a distance from its front end to permit vertical swing of the section and provided with a vertical slot in front of said pivoted point in which a stop on the harrow is confined, as and for the purposes set forth.

6. In a wheeled harrow, the combination, with the tongue or frame thereof, of a harrow-section and coupling-braces coupling said section to said tongue or frame, said braces being spread horizontally at their upper ends to prevent the section rocking transversely or swinging and secured to a horizontal bar of said tongue or frame, substantially as set forth.

7. In a wheeled harrow, the combination of the frame or tongue, the harrow-sections, the swinging coupling-bar, and the coupling-braces from said sections to said bar, separately united to said bar in vertical adjustment, as and for the purposes set forth.

8. In a harrow, the combination of an axle and wheels therefor, a tongue or frame at its rear portion supported by such axle, the harrow-sections independent of such axle, and coupling means and connections, substantially as described, extending forwardly from the front ends of such harrow-sections and secured to the said tongue or frame at a point in advance of the axle, so that the said sections have a joint lateral swing independently of the tongue and draft connections, substantially as set forth.

9. In combination, a wheeled axle, the tongue at its rear end carried by such axle, the harrow-sections, a swinging coupling-beam mounted on the tongue in advance of the axle, coupling connections from said harow-sections to said beam, so that the sections have a joint lateral swing from a common center, the swinging doubletree having the loose hangers directly coupled to the front ends of said sections, and the whiffletrees carried by such hangers, substantially as set forth.

10. In combination, the tongue, a wheeled axle supporting the rear end thereof, the harrow-sections independent of such axle, the coupling-beam centrally pivoted to such tongue a distance in advance of the axle, rigid coupling-bars extending upwardly and forwardly from the front ends of such sections to such beam and loosely joining the sections to the beam, the swinging doubletree, the depending hangers directly connected to the front ends of such sections, and the whiffletrees carried by such hangers, whereby when the draft is attached to such sections the front end of the tongue is lifted by said coupling-bars.

11. The combination of the tongue supported at its rear portion, the harrow-sections, a coupling-beam, and the coupling-bars connecting said sections and beam, each section having two bars secured to its front end, said bars being spread at their upper ends, substantially as described, and so constructed and connected that the inner and outer bars of each section can be correspondingly varied in length to swing the harrow-section laterally.

12. In combination, a suitably-supported frame or tongue, the two parallel harrow-sections, each harrow-section composed of a central tooth-beam, the two tooth-beams parallel therewith and on opposite sides thereof, and the parallel pivoted cross-links, and means to lock the beams when they have been expanded or contracted to convert the machine into either a straddle-row or common cultivator, and coupling-braces secured to the front ends of the central beams and connected to the tongue.

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

EFFINGER E. WHIPPLE.

Witnesses:

M. D. HUBBARD,

GEO. FERGUSON.