(No Model.) 4 Sheets—Sheet 1.

O. J. CHILDS.

HARROW.

No. 486,082. Patented Nov. 15, 1892.

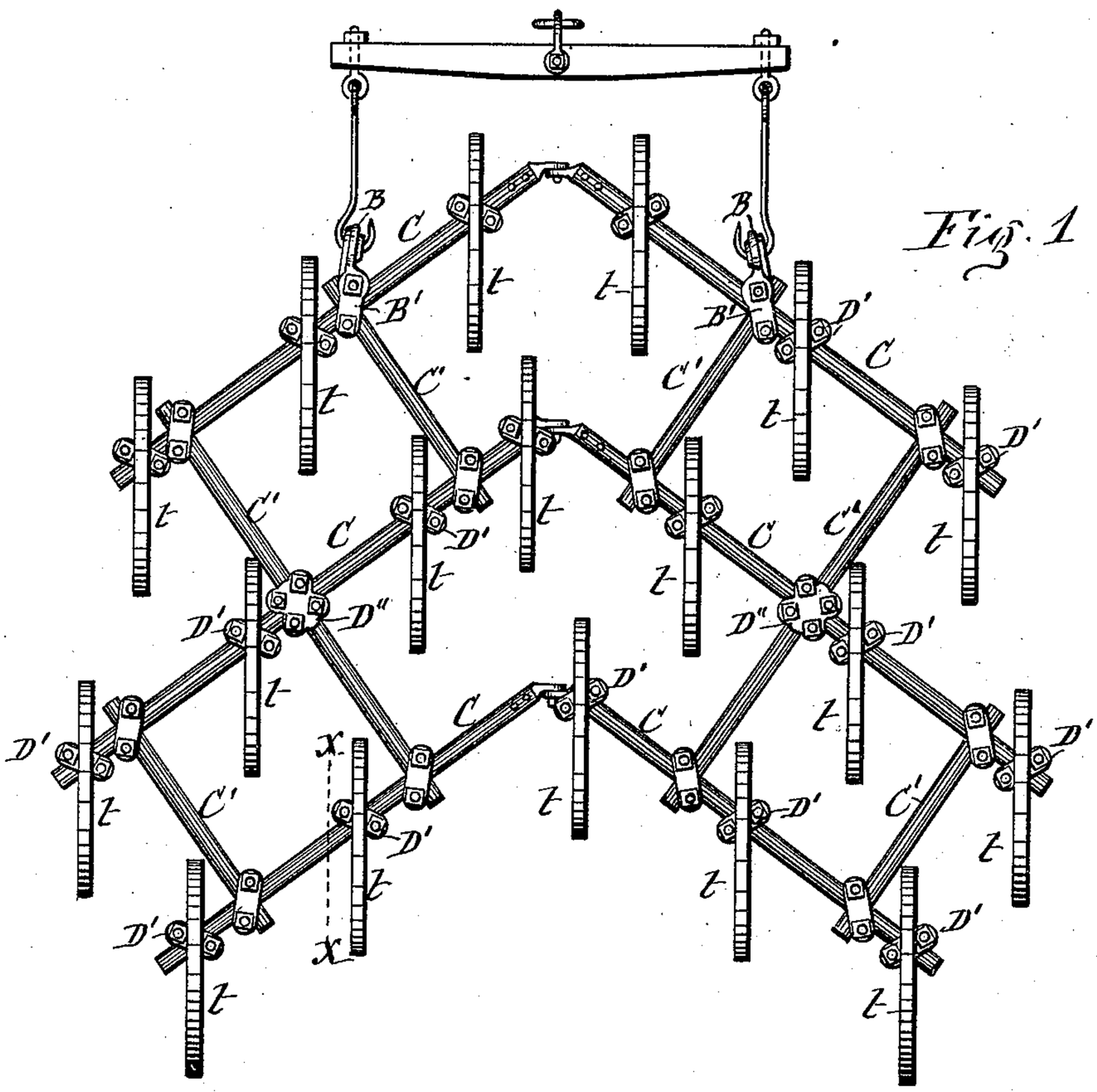

Fig. 1

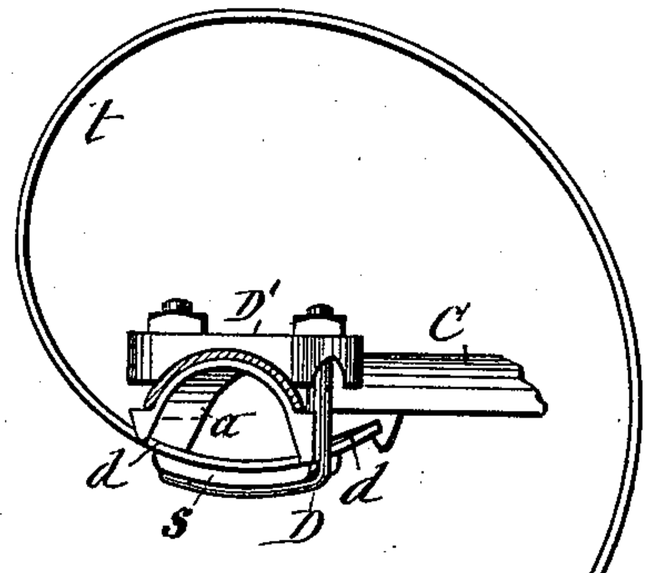

Fig. 2

WITNESSES:

C. L. Bendixon

J. J. Saass

INVENTOR

Orlando J. Childs

By Dodd Laass & Dodd

his ATTORNEYS.

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O. J. CHILDS.

HARROW.

No. 486,082. Patented Nov. 15, 1892.

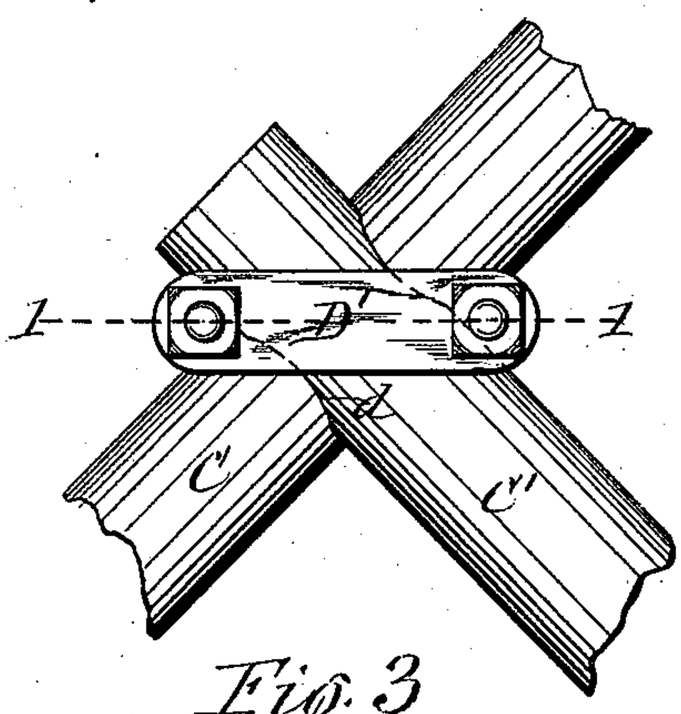

Fig. 3

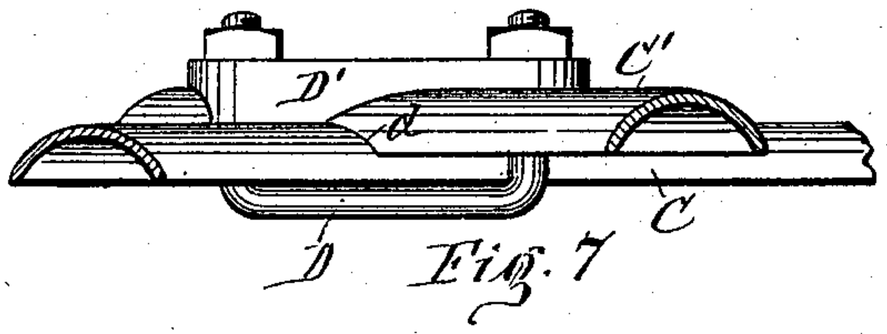

Fig. 7

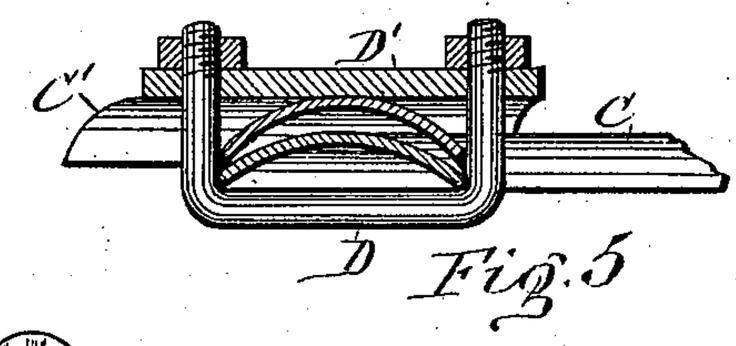

Fig. 5

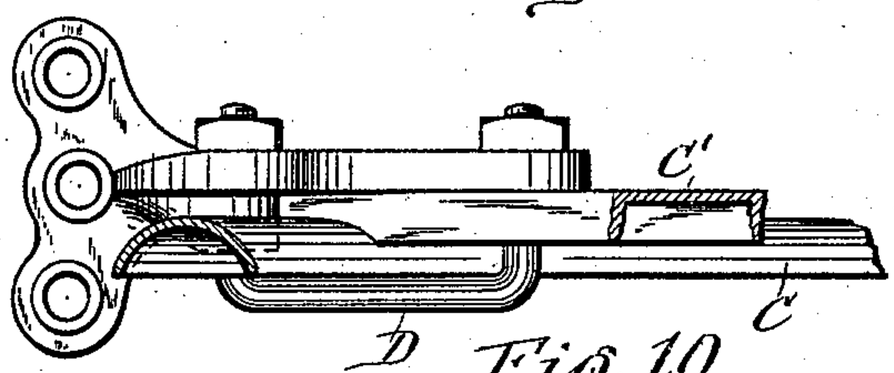

Fig. 10

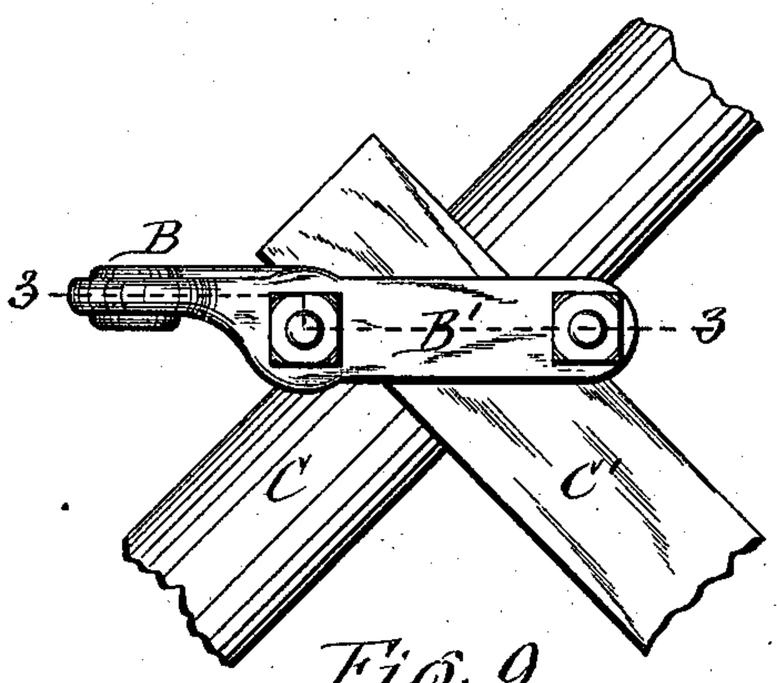

Fig. 9

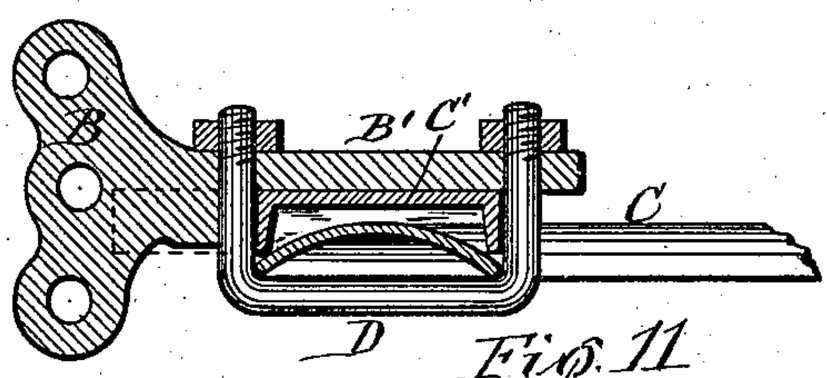

Fig. 11

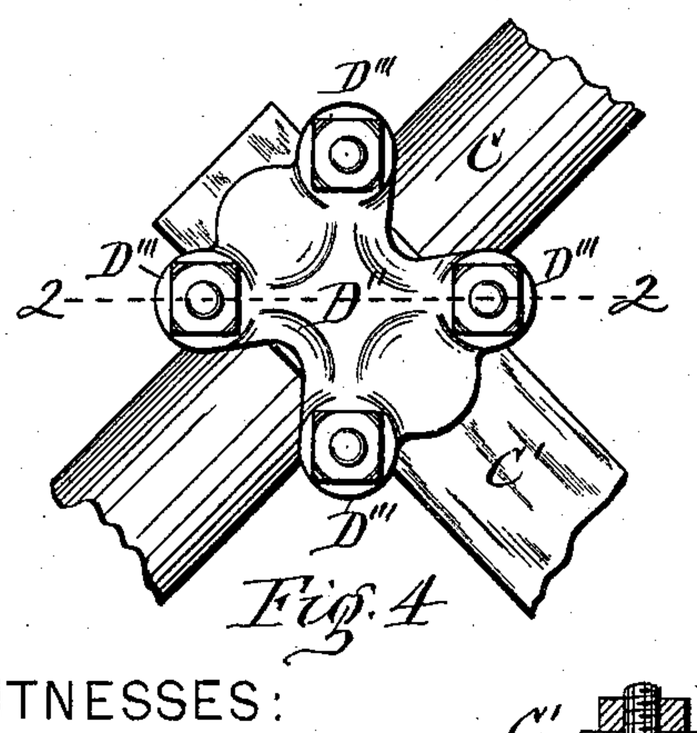

Fig. 4

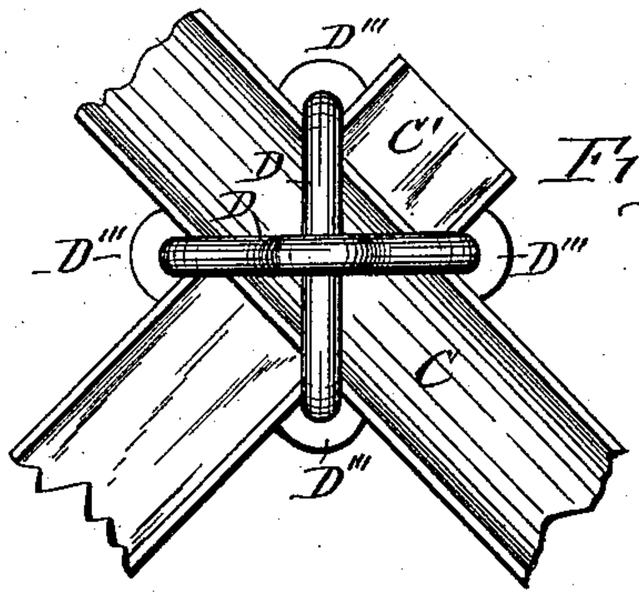

Fig. 8

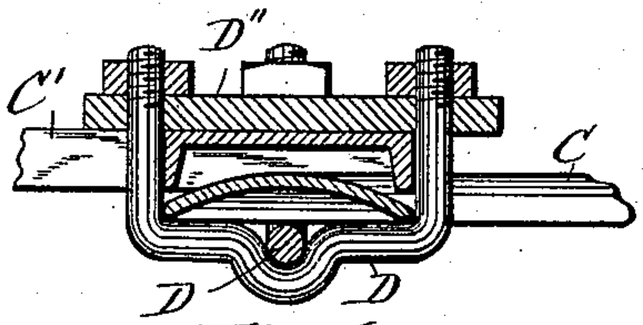

Fig. 6

WITNESSES:

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O. J. CHILDS.

HARROW.

No. 486,082. Patented Nov. 15, 1892.

Fig. 12½

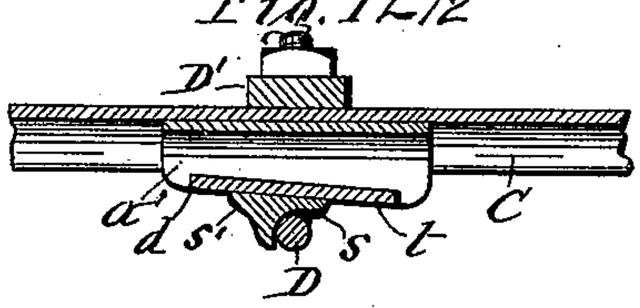


Fig. 12

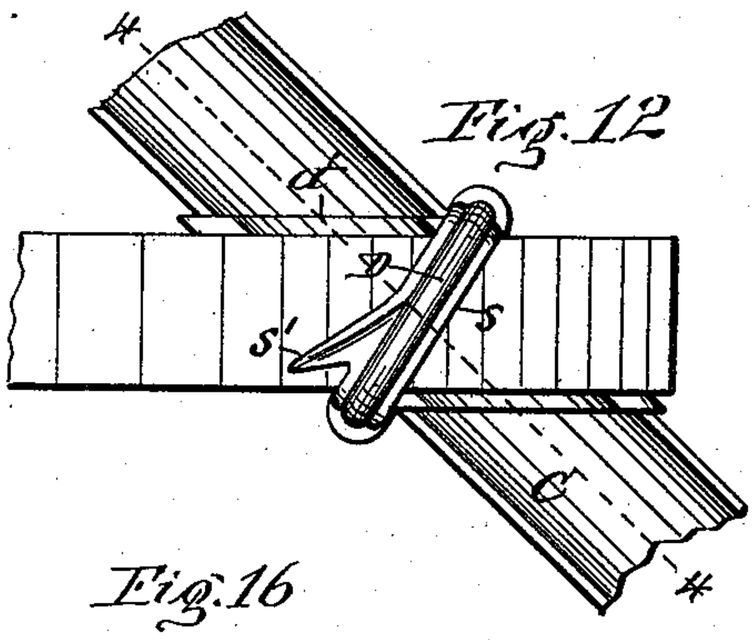


Fig. 13

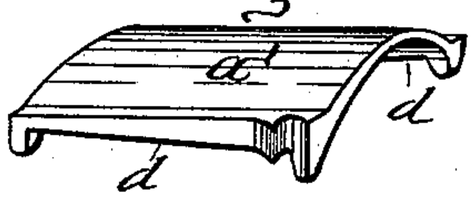
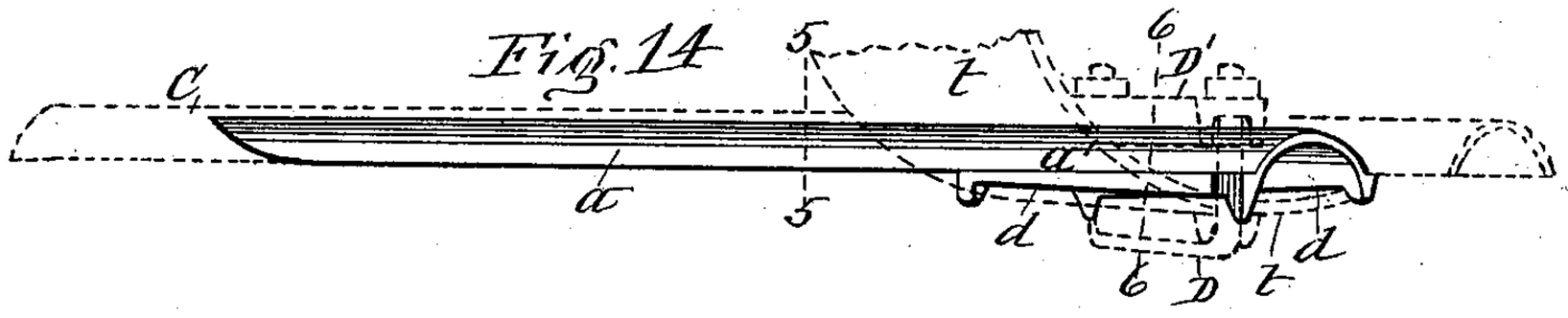


Fig. 16

Fig. 14



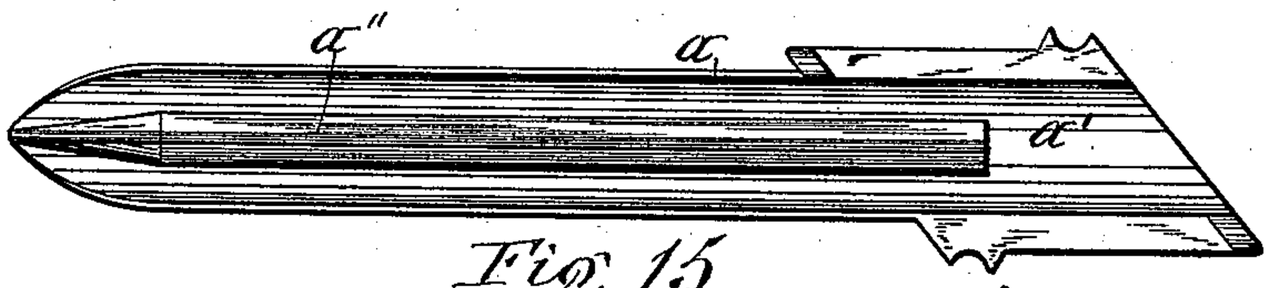
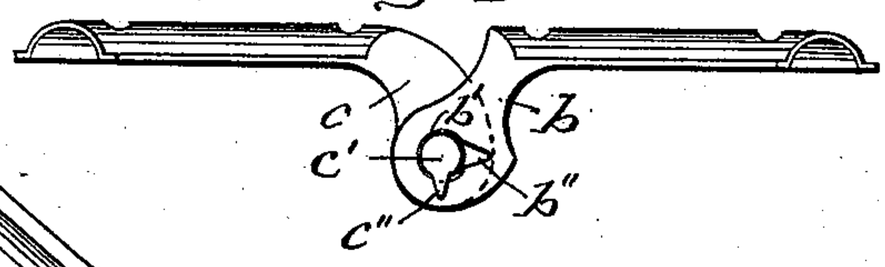


Fig. 15

Fig. 19



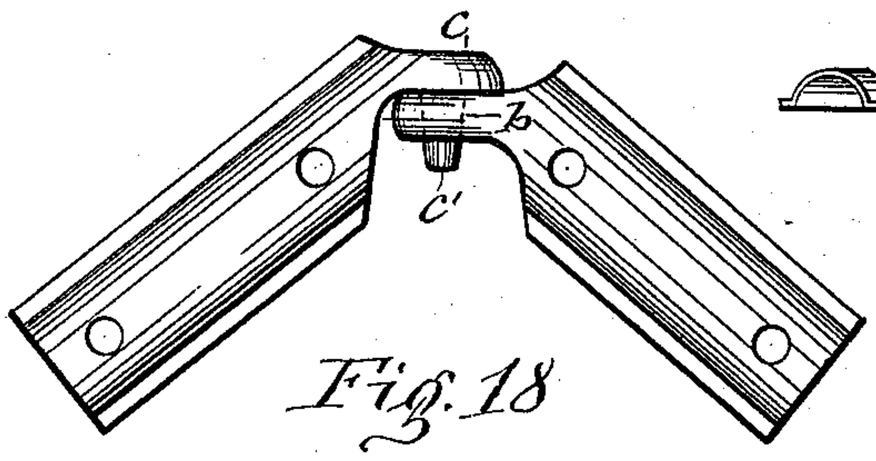


Fig. 18

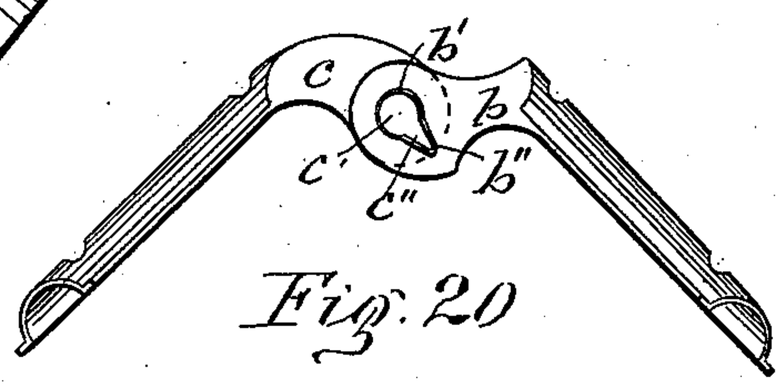


Fig. 20

WITNESSES:

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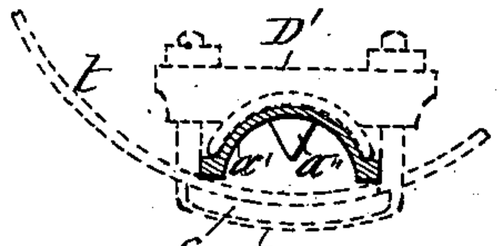

Fig. 17

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O. J. CHILDS.

HARROW.

No. 486,082. Patented Nov. 15, 1892.

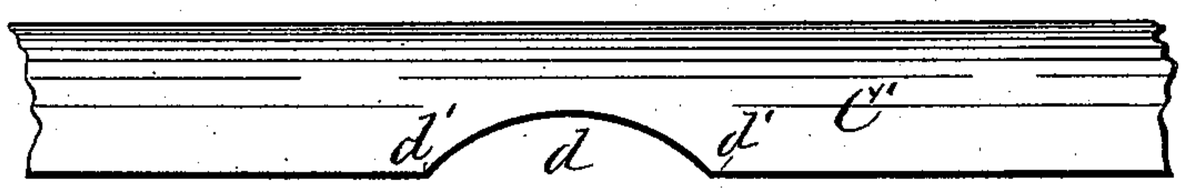

Fig. 21

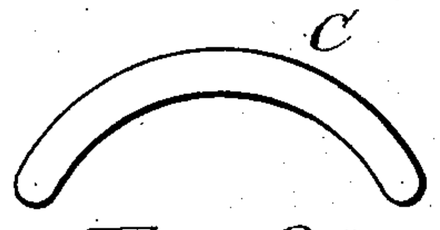

Fig. 22

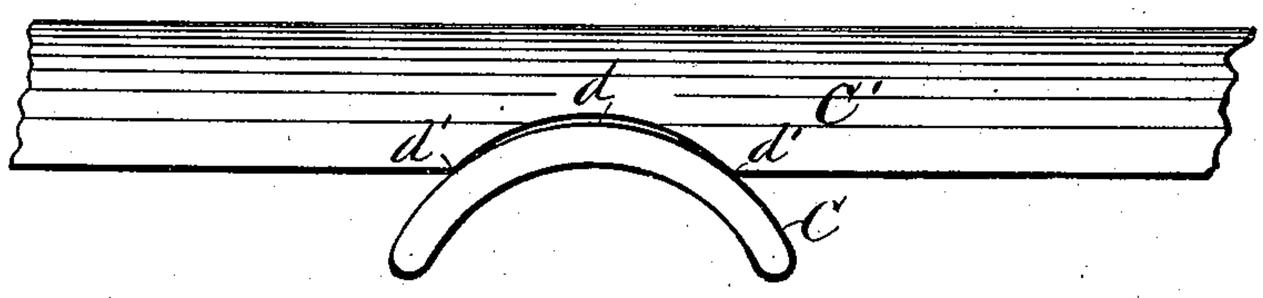

Fig. 23

WITNESSES:

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INVENTOR

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By Hull, Lasss & Dull

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ORLANDO J. CHILDS, OF UTICA, NEW YORK.

HARROW.

SPECIFICATION forming part of Letters Patent No. 486,082, dated November 15, 1892.

Application filed August 5, 1891. Serial No. 401,722. (No model.)

To all whom it may concern:

Be it known that I, ORLANDO J. CHILDS, of Utica, in the county of Oneida, in the State of New York, have invented new and useful Improvements in Harrows, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates, chiefly, to harrows equipped with curved spring-teeth.

One of the objects of the invention is to form the harrow-frame without resorting to perforating and thus weakening the component bars of the frame.

The object of the invention is also to render the frame adjustable for the attachment of a greater or less number of teeth; and the object of the invention, furthermore, is to render the harrow more efficient, more durable, and more convenient in various other respects; and to that end the invention consists in the improved construction and combination of parts hereinafter fully described, and set forth in the claims.

In the annexed drawings, Figure 1 is a plan view of a harrow embodying my improvements. Fig. 2 is an enlarged longitudinal vertical section on line *x x*, Fig. 1. Figs. 3 and 4 are enlarged top plan views of the connection of the draft-bars and cross-bars of the frame. Figs. 5 and 6 are transverse sections, respectively, on line 1 1 of Fig. 3 and line 2 2, Fig. 4. Fig. 7 is an edge view of Fig. 3. Fig. 8 is an inverted plan view of Fig. 4. Fig. 9 is a top plan view of the attachment of the draft-iron to the harrow-frame. Fig. 10 is a side view of the same. Fig. 11 is a vertical transverse section on line 3 3, Fig. 9. Fig. 12 is an inverted plan view of the attachment of the harrow-tooth. Fig. 12½ is a longitudinal section on line 4 4, Fig. 12. Fig. 13 is a detached perspective view of the bearing-plate of the tooth. Fig. 14 is a side view of the draft-bar supporting-arm. Fig. 15 is an inverted plan view of the same. Figs. 16 and 17 are transverse sections, respectively, on lines 5 5 and 6 6, Fig. 14. Figs. 18 and 19 are respectively plan and end views of the coupling of the harrow-frame sections shown in their normal positions. Fig. 20 shows the same in position for disconnecting the frame-sections. Figs. 21 and 22 are respectively detached side and end views of portions of one of the cross-bars and one of the draft-bars, and Fig. 23 is a side view of said parts in position to be united.

Similar letters of reference indicate corresponding parts.

C and C′ represent, respectively, the draft-bars and cross-bars of which the harrow-frame is composed. Said bars are each continuous and composed of iron or steel and channeled longitudinally, preferably concavo-convex in cross-section, and disposed with their concave sides downward. In order to cheapen the construction of the frame and at the same time obviate weakening the same and permit the cross-bars to be shifted on the draft-bars lengthwise of the latter and thus permit a greater or less number of teeth to be attached to the frame, I box the cross-bars on the draft-bars by simply cutting in the under sides or edges of the cross-bars concave recesses *d*, of a shorter radius than the convex tops of the draft-bars, upon which they rest and on which they are adjustably clamped by means of clips D, which embrace the bars at their points of crossing and have their attaching-shanks outside of the bars and in the corners of the crossing thereof and passing through clip-ties D′ and provided with nuts on the tops of said clip-ties. By tightening said nuts the draft-bar C and cross-bar C′ are firmly clamped between the clip and clip-tie. The ends of the recesses *d d* of the cross-bar form transverse biting-edges *d′ d′* on the under side of said bar, which edges afford firm grips on the draft-bar, and by the shanks or bolts of the clip pinching the edges of the two bars in the corners of their crossing effectually binds the cross-bar on the draft-bar. Aside from this, the boxing of the cross-bars on the draft-bars serves to retain the said bars in their requisite angles to each other.

In the majority of cases a single clip will answer at each crossing of the draft-bars and cross-bars, as represented in Figs. 3, 5, and 7 of the drawings; but on large and heavy harrows I prefer to employ in lieu of the ordinary clip-tie D′ a plate D″, placed upon the cross-bar and formed with four eyes D‴, as shown in Fig. 4 of the drawings, and in connection with said plate I use two clips D D, placed crosswise of each other, as illustrated in Fig.

8 of the drawings, and embracing the draft-bar and cross-bar and having their shanks or bolts in the four corners of the crossing of said bars and passing through the four eyes D''', upon which bear the nuts attached to the ends of the said clip-shanks or bolts.

By loosening the clips the cross-bars C' C' can be slipped along on the draft-bars lengthwise thereof to obtain more or less room for the attachment of the teeth to the draft-bars between the cross-bars.

To enable the front ends of the front draft-bars to better resist the downward draft of the teeth, I attach to the under side of said end of each draft-bar a supporting-arm *a*, which is concavo-convex in cross-section and fitted with its convex side to the concave under side of the draft-bar. The rear end of said brace has integral with it an attaching-plate *a'*, which is also concavo-convex in cross-section and seated with its convex side in the concave under side of the draft-bar and secured thereto by a suitable clip D.

I preferably make the plate *a'* serve the additional function of affording two bearing-edges, upon which the tooth *t* is clamped by the clip D, which embraces the bottom of the tooth and edges of the plate *a'* and draft-bar and has its shanks passing through the clip-tie D', placed astride the draft-bar, and by tightening the nuts on the ends of the clip-shanks the tooth *t* and plate *a'*, with the supporting-arm *a*, are firmly tied to the draft-bar.

It will be observed that by the aforesaid arrangement the tooth *t* and supporting-arm *a* are so connected together that in adjusting the tooth on the draft-bar to a greater or less distance from the end of the latter the aforesaid arm is carried and adjusted simultaneously with the tooth and maintained in the same position in relation to the tooth.

To strengthen the supporting-arm *a*, I form the same with a longitudinal rib *a''* in its concave side, as shown in Figs. 15 and 16 of the drawings.

I prefer to attach all the teeth *t t t* to the draft-bars C C independent of the cross-bars C' C' and adjustably longitudinally on said draft-bars by employing, in connection with each tooth, a bearing-plate *a'*, applied to the under side of the draft-bar and formed at opposite sides with recessed seats *d d* for the shank of the tooth and a clip D and clip-tie D', embracing and clamping the aforesaid bearing-plate and tooth on the draft-bar, as shown in Figs. 2, 11, 12, and 17 of the drawings. Said attachment not only obviates the necessity of perforating the draft-bars, but also permits a ready adjustment of the teeth lengthwise of the draft-bars to set said teeth the requisite distances apart. In order to hold the tooth more firmly on its seats *d d* during the operation of the harrow, I interpose between the horizontal cross-bar of the clip a shoe *s*, formed with a tongue *s'*, extending in the direction lengthwise of the tooth and bearing on the under side thereof, so as to brace the same, as illustrated in Figs. 11 and 12 of the drawings.

B B denote the draft-irons to which the whiffletree or doubletree is connected, as represented in Fig. 1 of the drawings. To allow said draft-irons to be shifted lengthwise on the front draft-bars C C to accommodate the former to different lengths of the whiffletrees or doubletrees, I form the draft-irons, respectively, with an attaching-shank B' of the form of a clip-tie or saddle, which straddles the top of the cross-bar C' and is secured to the frame by the clip D, embracing the draft-bar C and cross-bar C' at their crossing and passing through the shank B' and provided with nuts on its ends, as shown in Figs. 9, 10, and 11 of the drawings.

b and *c* represent the two coupling-ears, by which the two frame-sections of the harrow are connected to each other. In order to allow the said frame-sections to be detached from each other when desired and yet guard against their becoming accidentally detached while the harrow is in use, I form the coupling-ear *b* with an eye *b'* and a notch *b''*, extending laterally from said eye, and form the other coupling-ear *c* with the trunnion *c'*, which passes through the eye *b'* and has a lug *c'* extending laterally from it and adapted to pass through the notch *b''*. Said notch and lug standing at an angle to each other when the two frame-sections are in their normal or horizontal position, as illustrated in Fig. 19 of the drawings, and thus confine the ear *b* on the ear *c* and to disconnect the harrow-sections, the inner portions thereof have to be raised to throw said sections into an angle to each other and bring the lug *c''* in line with the notch *b''*, as shown in Fig. 20 of the drawings, and inasmuch as the harrow-frame is not liable to be accidentally thrown into such a position the aforesaid coupling of the frame-sections is perfectly safe.

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

1. In combination with the frame-bar channeled longitudinally in its under side, the plate *a'*, seated in the channel of said bar and confined in alignment thereby and provided with recessed seats in its opposite edges, the tooth lying in said seats, the shoe *s*, lying across the under side of the tooth and formed with the tongue *s'*, extending lengthwise of the tooth to brace the same, and the clip lying in the shoe and embracing the bar, substantially as described and shown.

2. In a harrow-frame, the combination, with the draft-bar, of the cross-bar boxed thereon and movable lengthwise thereof, a plate upon the cross-bar at the point of crossing and provided with bolt-holes at the four corners of the crossing of the bars, and two clips crossing each other on the under side of the draft-bar and having their attaching-shanks outside of the bars in the four corners of the crossing thereof and passing through the bolt-

holes of the aforesaid plate, and nuts on the ends of said clip-shanks, as set forth.

3. The combination of the harrow-frame composed of draft-bars and cross-bars boxed on said draft-bars and movable lengthwise thereof, of a draft-iron having its attaching-shank extending across the said bars at their point of crossing, and a clip embracing said bars and secured to the draft-iron shank, substantially as described and shown.

4. The combination of the draft-bar formed concavo-convex in cross-section and disposed with its concave side downward, the plate a', formed likewise concavo-convex and seated with its convex side in the concave side of the draft-bar and projecting beneath the edges thereof, the spring-tooth seated on the bottom edges of the plate a', a clip securing the tooth and plate to the draft-bar, and the supporting-arm a, formed integral with the plate a', and having its free end extending under the front end of the draft-bar and bearing thereon, as and for the purpose set forth.

5. In combination with the concavo-convex draft-bar, the supporting-arm a, secured at its rear end to the under side of the draft-bar and formed likewise concavo-convex in cross-section, and with the longitudinal strengthening-rib a'' in its concave side, as set forth and shown.

In testimony whereof I have hereunto signed my name this 28th day of July, 1891.

ORLANDO J. CHILDS. [L. S.]

Witnesses:
H. M. SEAMANS,
J. J. LAASS.