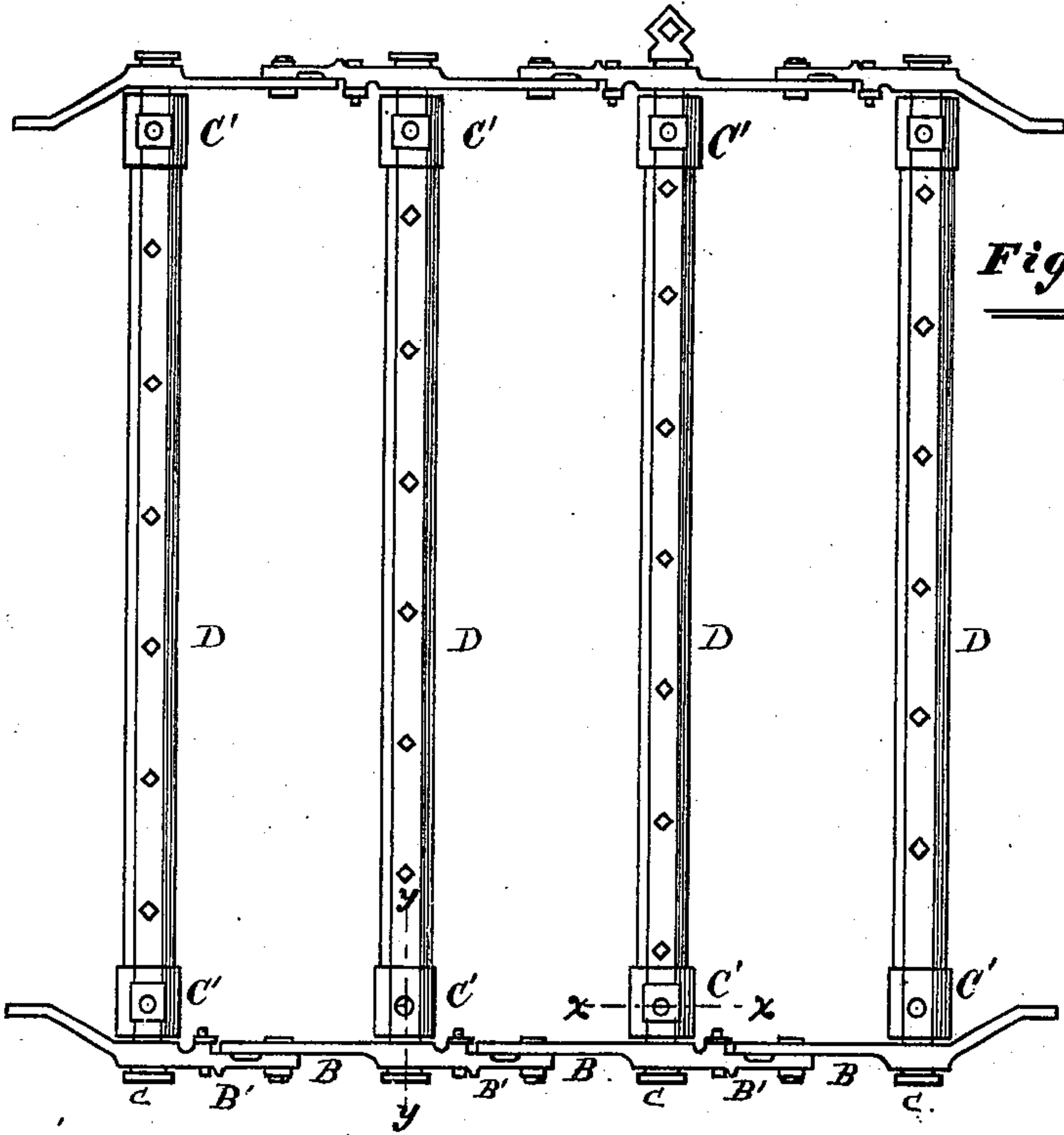


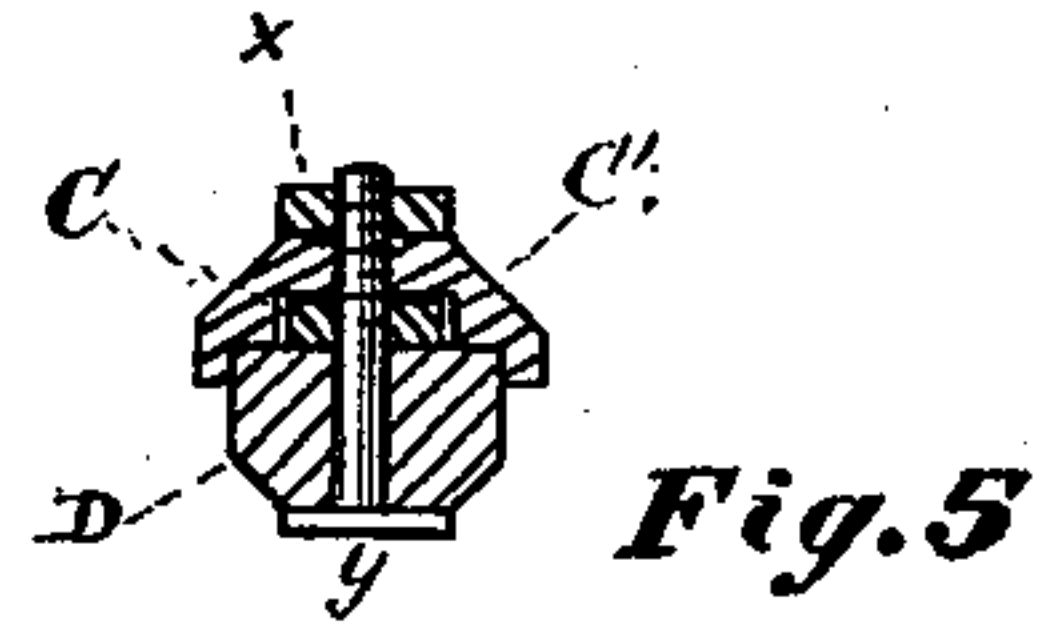
P. McDONALD.  
Farm-Harrow.

No. 210,046.

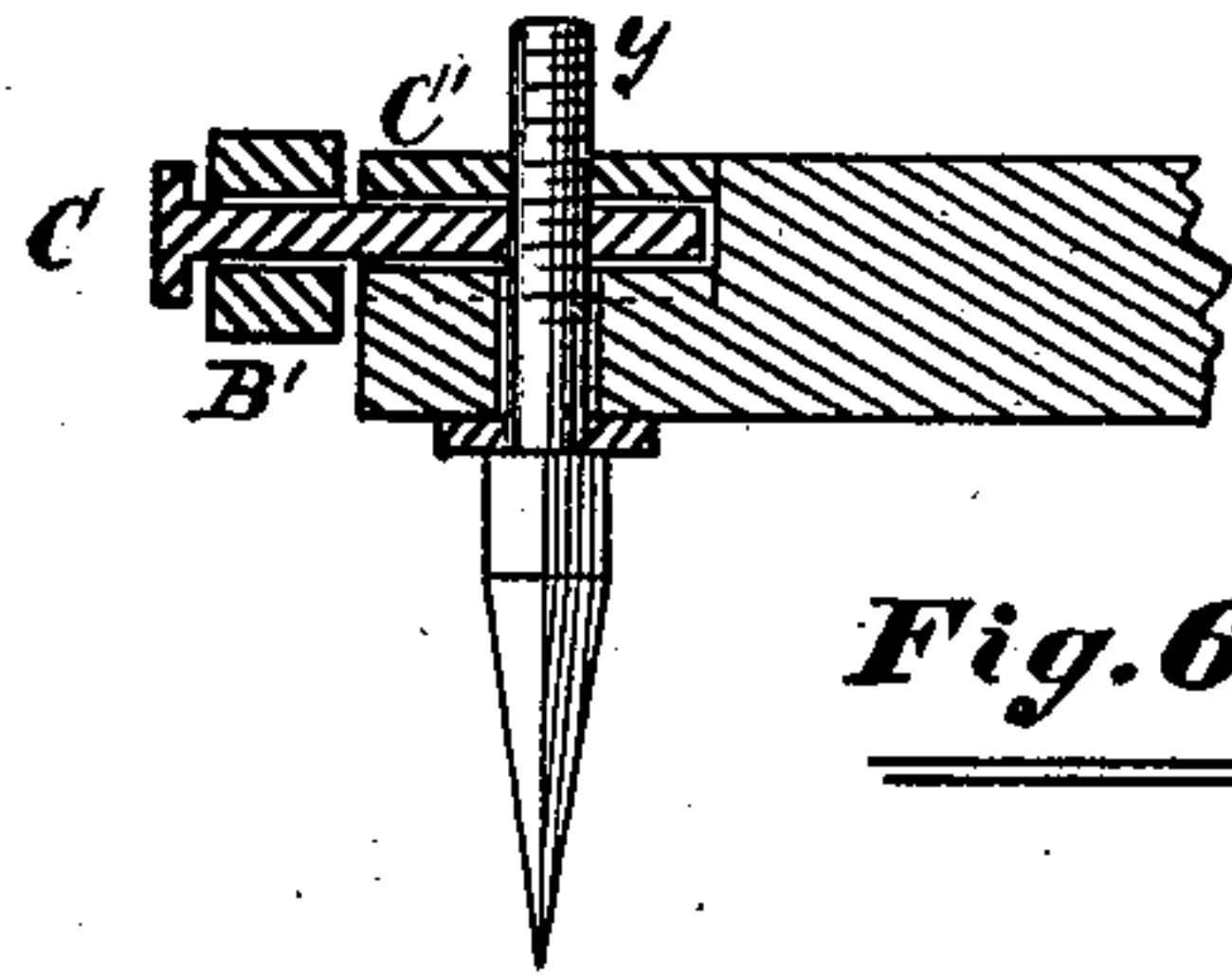
Patented Nov. 19, 1878.



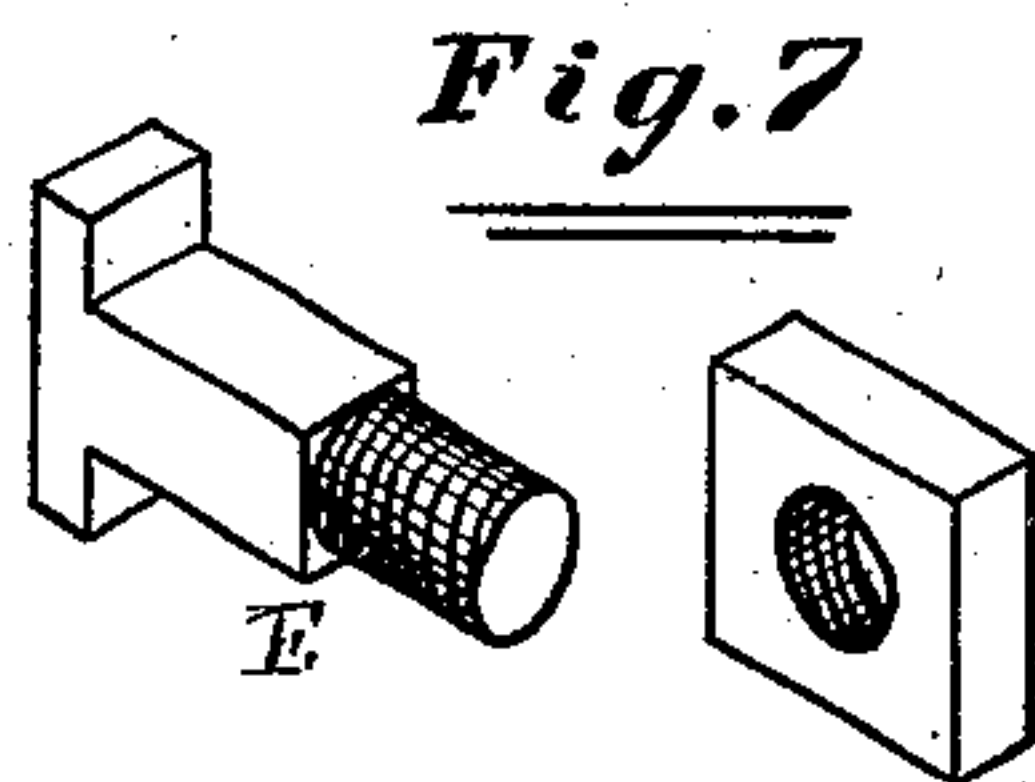
**Fig. 1**



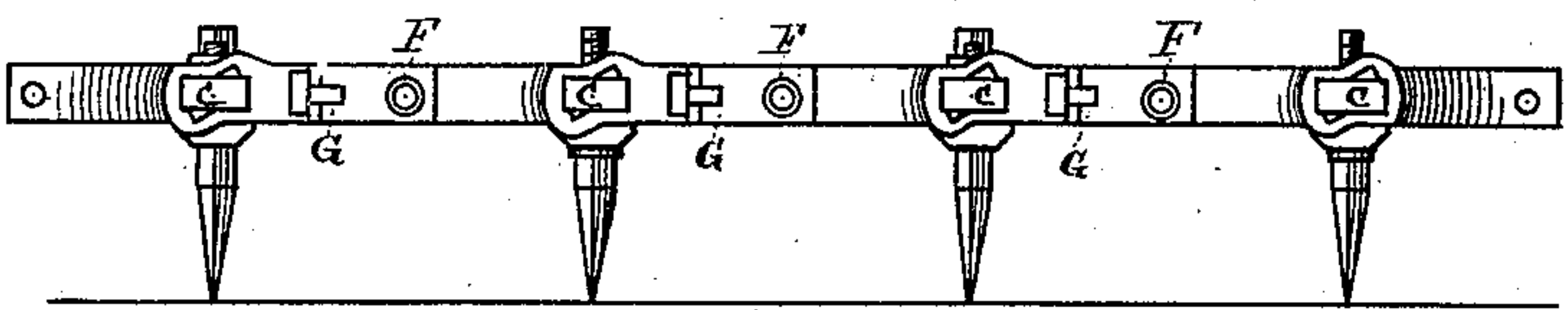
**Fig. 5**



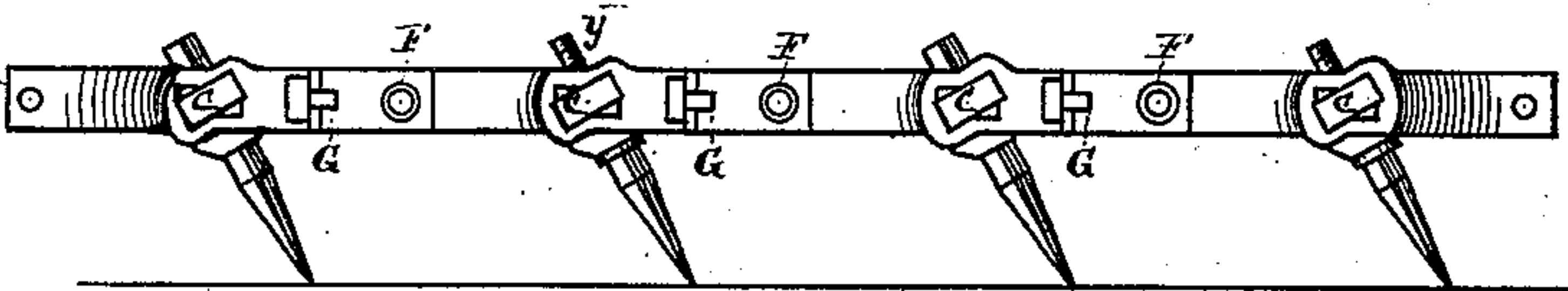
**Fig. 6**



**Fig. 7**



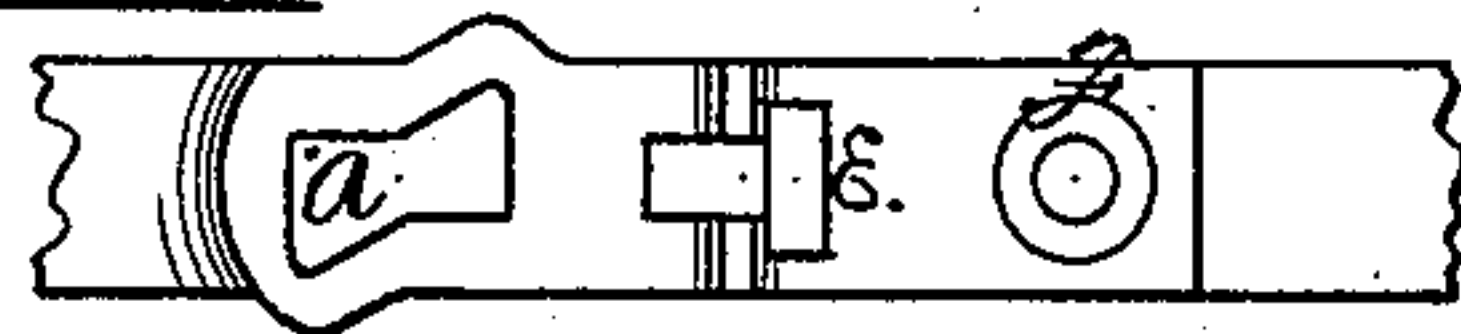
**Fig. 2**



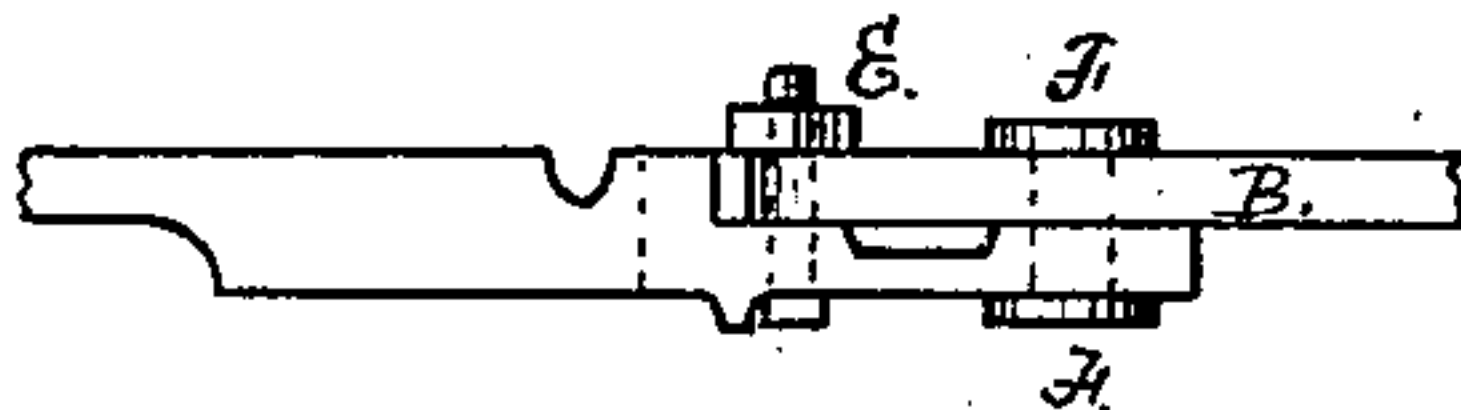
**Fig. 3**



**Fig. 4**

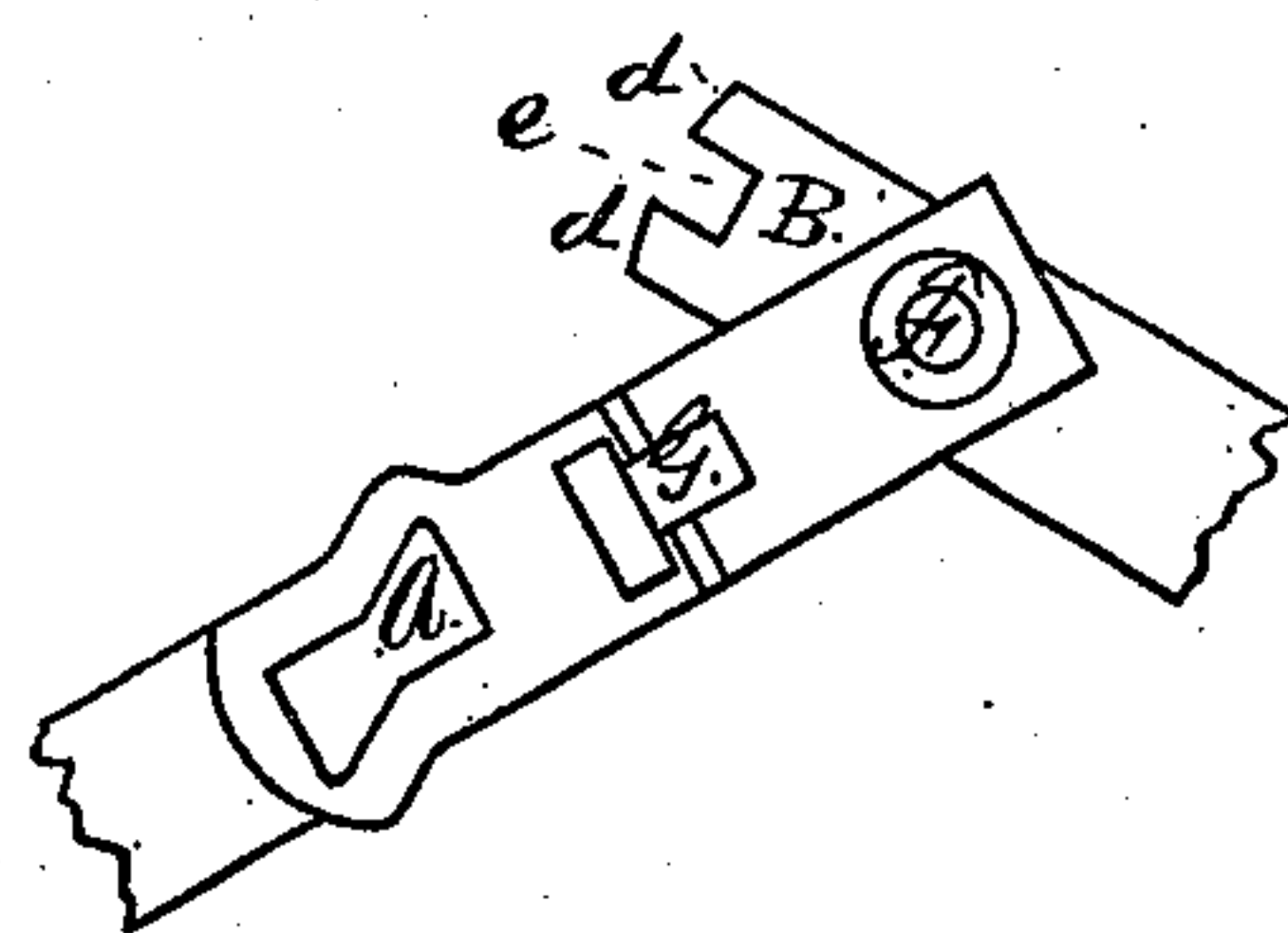


**Fig. 8**



**Fig. 9**

**Fig. 10**



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*J. L. Cleveland*  
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# UNITED STATES PATENT OFFICE.

PLATT McDONALD, OF PLYMOUTH, INDIANA.

## IMPROVEMENT IN FARM-HARROWS.

Specification forming part of Letters Patent No. **210,046**, dated November 19, 1878; application filed July 15, 1878.

*To all whom it may concern:*

Be it known that I, PLATT McDONALD, of the city of Plymouth, county of Marshall, and State of Indiana, have invented a new and valuable Improvement in Harrows, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, forming a part of this specification, and the letters of reference marked thereon.

Figure 1 of the drawings is a plan view of my improved harrow. Fig. 2 is a vertical section of the same. Fig. 3 is a vertical section of the same. Fig. 4 is plan view of the adjustable couplings. Fig. 5 is a transverse section of the end piece of the tooth-bars. Fig. 6 is a sectional view of the same. Fig. 7 is a perspective view in detail. Fig. 8 is a side view of the adjustable coupling. Fig. 9 is a top view of the same. Fig. 10 is a side view of same.

The object of my invention is to construct an adjustable harrow in such a manner as to render it flexible or rigid, or partially flexible, at the will of the operator, the harrow having the tooth-bars arranged in such a manner that they will draw at different angles when the frame is reversed, whereby the draft can be made easier when required, and hard or rooty soils can be more readily subdued and pulverized.

In the annexed drawings, the letter D represents the transverse bars of the frame, placed parallel with each other, and provided with steel or iron teeth, so located with reference to each other that each individual tooth is made to cut a track separate and distinct from any other. The tooth-bars D are connected at each end to the adjustable couplings B B' by means of the T-shaped tenon C, which passes through the adjusting-slot *a* of the coupling, and is secured to the tooth-bar by means of a clamp-plate, C', and a bolt, or the threaded end of the tooth *y*, which passes through a perforation in the tenon and through the plate C', as shown in Fig. 5 of the drawings. The plate C' is constructed with a view to conform to the shape of the upper portion of the tooth-bar, and in the drawings is shown of angular form. It is recessed underneath to receive the tooth-bar and the T-shaped tenon C. These end attachments and couplings are made of mallea-

ble or wrought iron, or other suitable material. The adjustable couplings extend lengthwise at the ends of the tooth-bars, and consist of sections of the side bars pivoted together. Each section consists of two arms, B B', and a central portion or body, made of one piece of metal, the center portion being provided with the slot *a* for the reception of the tenon C, which serves to attach it in a flexible manner to the tooth-bar D.

The letter F designates the pivot-bolt which connects the ends of the coupling-sections. A slip-bolt, E, works through a slot, G, in the arm B', serving to engage the forked end of the arm B when a rigid condition of the harrow-frame is desired. In order to render this harrow rigid by means of this slip-joint, the adjusting-bolt E, which works in the slot G of the arm B' of the coupling, is slipped forward between the jaws *d* of the forked end of the arm B, and a nut is screwed down on said bolt.

When a flexible arrangement of the parts is required, the nut is loosened from the bolt E, which is slipped out of engagement with the forked end of the arm B, thereby rendering the joint loose and vibratory on the bolt F, as shown in Fig. 10 of the drawings. The harrow-frame is thus rendered flexible, and will conform to the inequalities of the ground.

The position of the teeth is regulated by the vibration of the coupling-sections and the center slot *a*, whose peculiar dovetail form, as shown in Fig. 3 of the drawings, in conjunction with the tenon C, especially adapts it to the change from a vertical to an inclined position of the tooth-bar D and the teeth thereof.

The tenon C is constructed with a flanged head and parallel sides and edges, and fits loosely in the slot *a*. The slot *a* is of peculiar shape. It is wider at the ends than in the middle, these wings tapering toward the center, and forming bearings for the tenon C at two different angles, as shown in Figs. 8 and 10 of the drawings. This slot is higher on one side than the other, and so shaped that each wing has therefore a horizontal bearing and an inclined bearing for the tenon, one set of bearings being at an angle to the line of draft, but in the same plane of inclination; the other set of

bearings being horizontal or parallel with the draft, and, consequently, parallel with the end couplings in which they are made.

By changing the draft to opposite ends of the harrow, the teeth will automatically adjust themselves, drawing vertically or at an angle, as the case may be.

This harrow, when not in use, can be folded up with the teeth pointing inward by flexing the couplings, thus reducing its bulk, and putting it in form for transportation or storage.

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

1. The adjustable sectional side couplings B B', having the central double dovetail slot *a*, slot G, bolts E and F, and the end fork *e*, in combination with the T-shaped end tenon C of the tooth-bar, substantially as specified.

2. In a harrow-frame, the side bars having the double dovetail slots *a*, adapted to receive the end tenons of the tooth-bars for automatic adjustment, as shown and described.

PLATT McDONALD.

Attest:

JAS. L. CLEAVELAND,  
N. J. CLUTE.