

(No Model.)

F. J. MARSHAL.

HARROW.

No. 334,180.

Patented Jan. 12, 1886.

FIG-1-

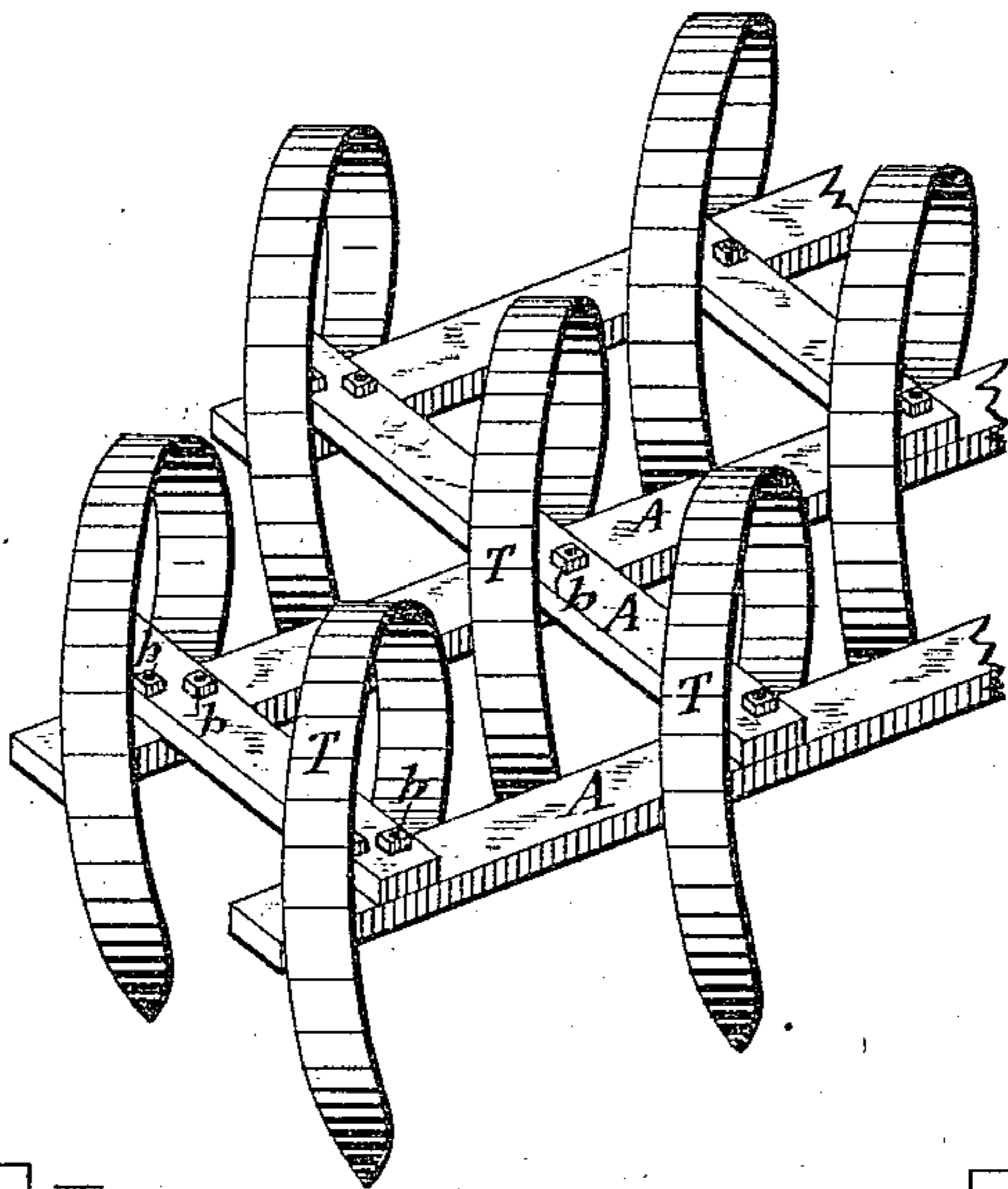


FIG-2-

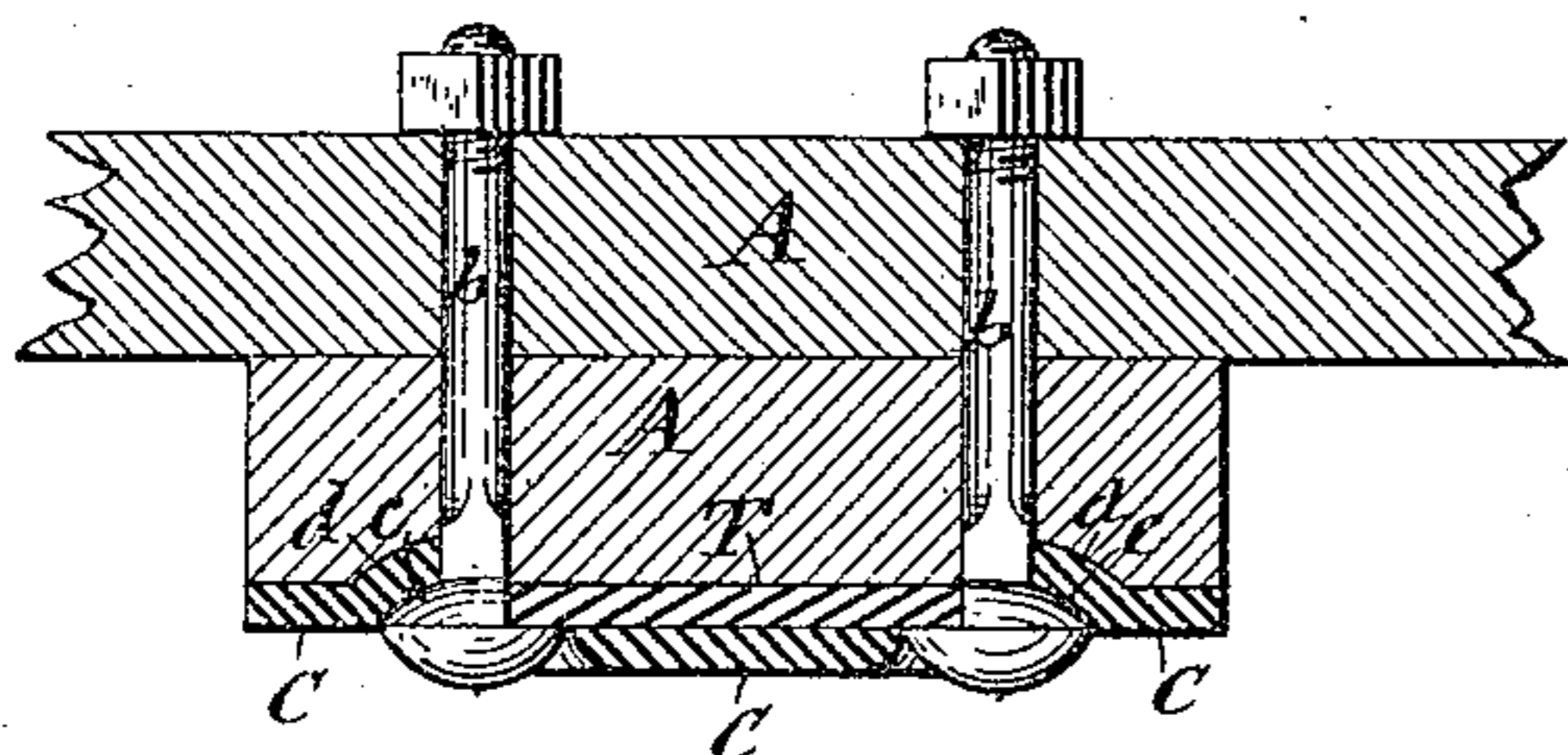


FIG-4-

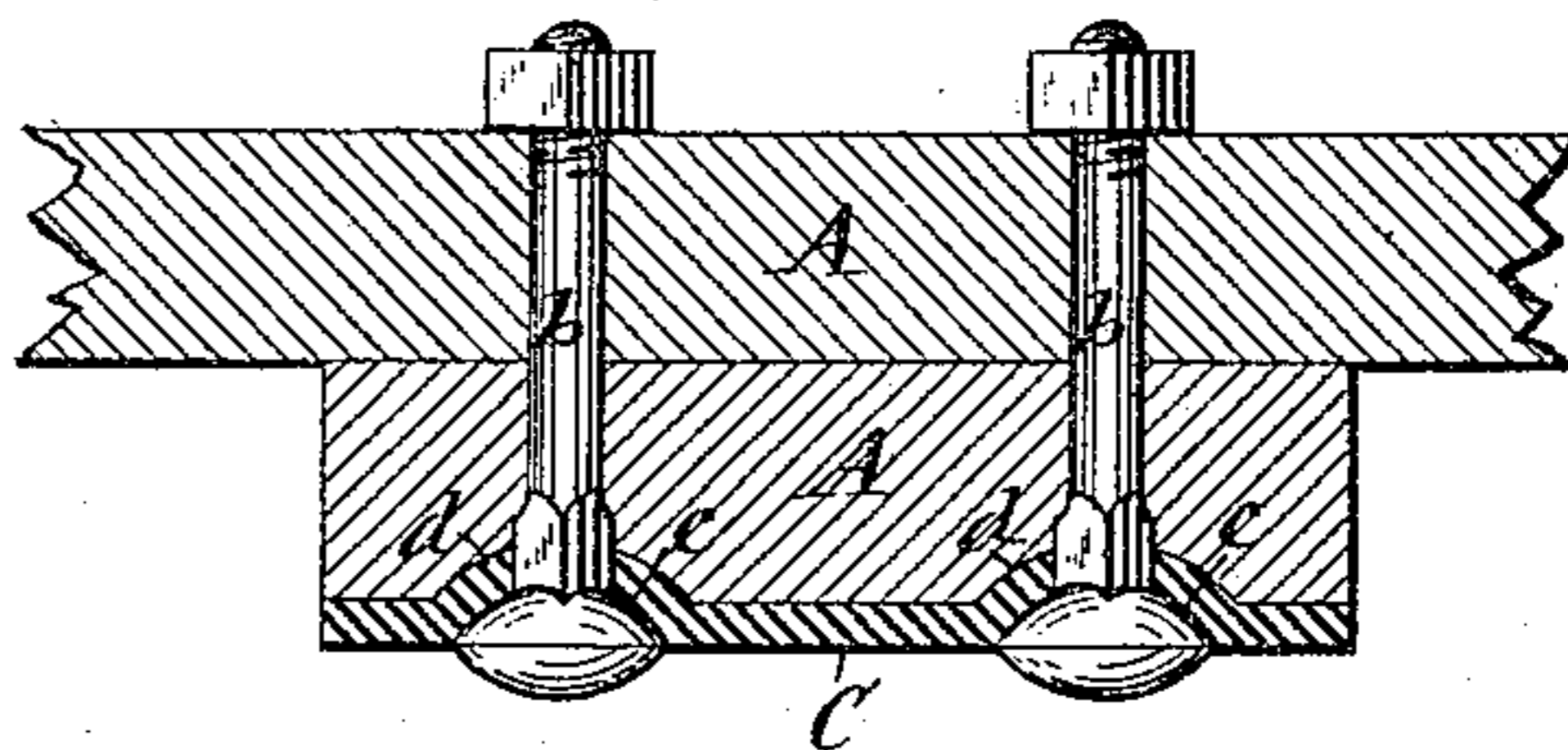


FIG-5-

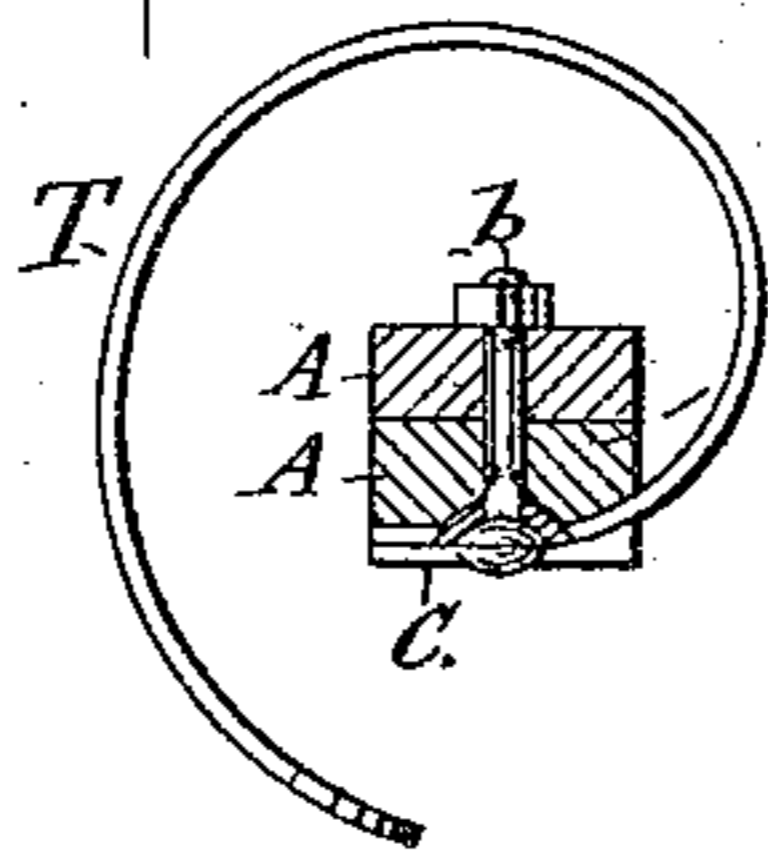


FIG-3-

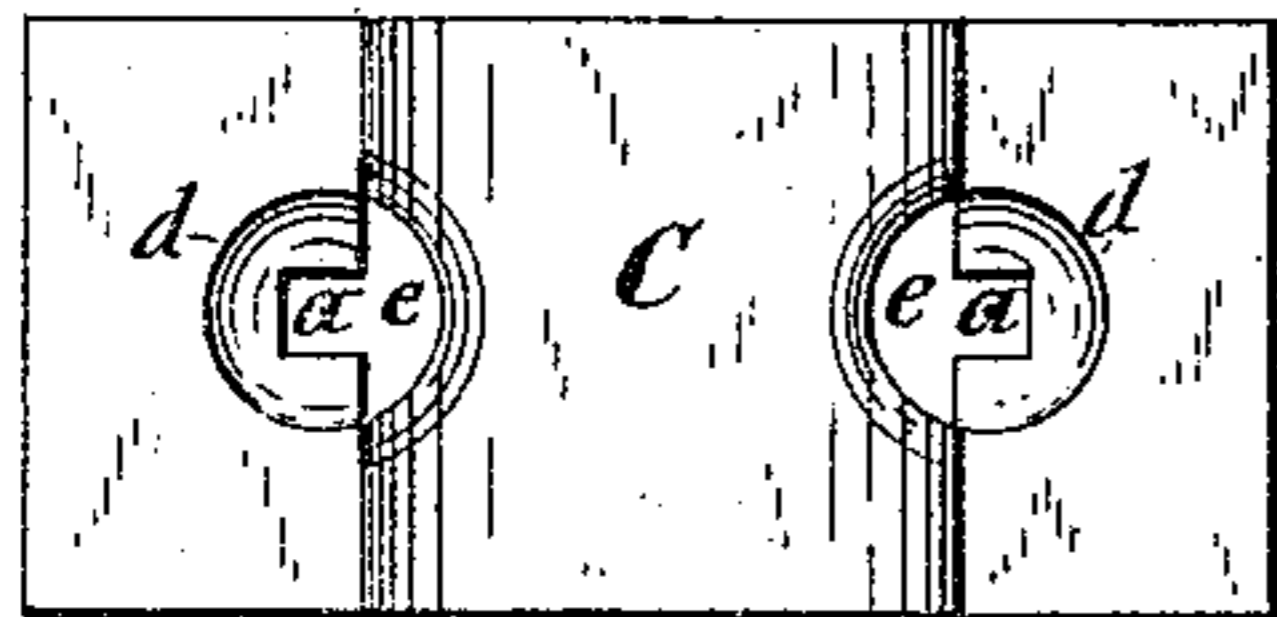
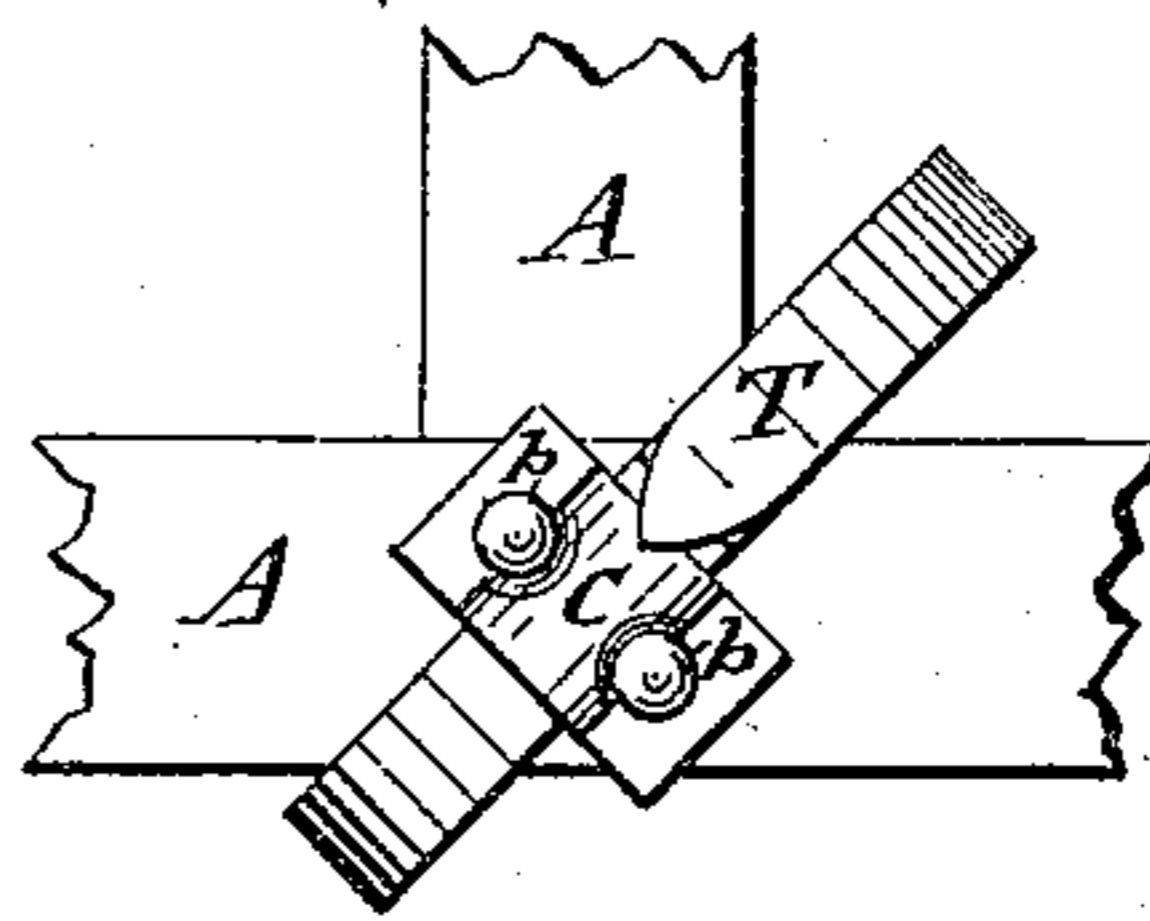


FIG-6-



ATTEST—

*Wm B. Raymond*  
*J. H. Esler*

INVENTOR—

*Franklin J. Marshal*  
*per Wm. L. Loomis*  
*attys*

# UNITED STATES PATENT OFFICE.

FRANKLIN J. MARSHAL, OF WHEELER, NEW YORK, ASSIGNOR TO OTTO F. MARSHAL, JR., OF SAME PLACE.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 334,180, dated January 12, 1886.

Application filed May 14, 1885. Serial No. 165,509. (No model.)

*To all whom it may concern:*

Be it known that I, FRANKLIN J. MARSHAL, of Wheeler, in the county of Steuben, in the State of New York, have invented new and  
5 useful Improvements in Harrows, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

In the operation of harrows it has been  
10 found that the friction and abrasion on the heads of the tie-bolts of the harrow-frame incident to the dragging of the same over the soil rapidly wears away the said heads, and thus destroys the integrity of the frame, and  
15 in spring-tooth harrows the teeth loose their hold on the frame by the aforesaid destruction of the bolt-heads.

It is to obviate the aforesaid defects, and thus render the harrow more durable which  
20 my invention has for its object; and to that end my invention consists in the novel construction and combination of parts, as herein-after fully described, and specifically pointed out in the claims.

25 The invention is fully illustrated in the annexed drawings, wherein Figure 1 is a perspective view of a portion of one of the styles of harrows for which my invention is specially adapted. Fig. 2 is an enlarged sectional view  
30 illustrating the application of my invention for securing a spring-tooth to the harrow-frame. Fig. 3 is a detached plan view of the plate which is placed astride the shank of the spring-tooth. Fig. 4 is a sectional view illustrating the invention as employed for tying  
35 together the members of the harrow-frame. Fig. 5 is a transverse section taken at the side of a spring-tooth attached by my invention, and Fig. 6 is an inverted plan view of a portion of a spring-tooth harrow embodying my  
40 invention.

Similar letters of reference indicate corresponding parts.

45 A A represent the wooden bars of which the harrow-frame is formed, one set of said bars being placed across the other set and secured thereto by tie-bolts *b b* passing vertically through said bars at their crossings. In order to obtain a more secure hold for the said

tie-bolts on the frame, and guard against the  
50 wear and enlargement of the bolt-holes in the frame, and at the same time protect the heads of the tie-bolts from wear and abrasion incident to the dragging of the same over the soil, I place on the under side of the bottom bar  
55 A a plate or washer, C, provided with bolt-holes for the reception of the tie-bolts *b b*, and around the said bolt-holes I strike up from said plate, by means of suitable dies, concavo-convex portions forming concave countersinks  
60 *c c* on one side of the plate and protuberances *d d* on the opposite side of said plate, the latter side being placed against the under side of the bar A, and the protuberances of the plate being let into corresponding countersinks in  
65 said bar, as represented in Fig. 4 of the drawings, thereby obtaining a secure hold for said plate, so as to effectually prevent its movement laterally. The backs or shoulders of the heads of the bolts are made convex, corresponding to the concavity of the countersinks  
70 *c c*, so as to let said shoulders completely into them, as represented in Fig. 4 of the drawings, thereby protecting the chief portions of the bolt-heads from the wear and abrasion incident to their being dragged over the ground  
75 when the harrow is in use. In fact, the bolts retain their hold until the plate is worn out. To prevent the bolts from turning, I make the bolt-holes of the plate C square, and provide  
80 the bolts with corresponding square necks adjacent to the convex shoulders.

For the attachment of the spring-tooth T, I place the plate C astride the shank of the tooth and against the bar A, as shown in Fig.  
85 2 of the drawings, and provide said plate with square bolt-holes *a a* at the edges of said shank, and with openings *e e* over the shanks and adjacent to one side of the bolt-hole, as illustrated in Fig. 3 of the drawings, and around  
90 the remainder of the bolt-holes the plate is formed with the concavo-convex countersinks *c c*. The tie-bolts *b b* are provided with the square necks, which extend through the square bolt-holes, and the backs of the bolt-heads are  
95 formed at one side with straight right-angled shoulders, which allow said portions of the bolt-heads to project into the openings *e e* of

the plate C, and bear directly on the shank of the tooth. The remaining portions of the bolt-heads are formed with convexed backs or shoulders, by which they are seated in the  
 5 concave countersinks *c c*. Said countersinks being formed by pressing or striking portions of the plate from the plane thereof produces corresponding convex protuberances at the back of the plate, and said protuberances be-  
 10 ing countersunk or let into the bar A serve to prevent the plate from shifting on the bar, and thus contributes to the security of the attachment of the spring-tooth.

I am aware that it is a common expedient  
 5 to countersink the heads of bolts and screws in the plates or washers, through which said bolts or screws pass; hence I do not claim, broadly, a harrow-tooth attaching clip or plate provided around its bolt-holes with counter-  
 10 sinks for the reception of the backs or shoulders of the bolt-heads; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. In a harrow-frame, the plate C, having  
 5 bolt-holes with recesses and protuberances, respectively, on opposite sides of the plate around said bolt-holes, and having said protuberances seated in corresponding counter-  
 10 sinks in the frame, and the tie-bolts having their heads seated in the recesses of the plate, substantially as set forth.

2. In combination with a harrow-frame and spring-teeth, plates placed astride the shanks of said teeth and against the harrow-frame,  
 5 and provided with bolt-holes at the edges of said shanks, and tie-bolts passing through said holes and having back of their heads straight right-angled shoulders abutting against the edges of the tooth-shanks, substantially as set  
 10 forth.

3. In combination with a harrow-frame and spring-teeth, plates or washers placed astride the shanks of the teeth and against the harrow-

frame, and provided with square bolt-holes at the edges of said shanks, and tie-bolts formed  
 45 with square necks passing through the afore-said bolt-holes and with straight right-angled shoulders under their heads and abutting against the edges of the shanks, substantially as described and shown. 50

4. In combination with the harrow-frame and spring-teeth, plates placed astride the shanks of the teeth and against the harrow-frame, and provided with bolt-holes at the edges of said shanks and with openings over  
 55 the shanks and adjacent to one side of the bolt-holes, and formed with countersinks around the remainder of the bolt-holes, and tie-bolts having the shoulder at one side of their heads bearing directly on the shanks of  
 60 the teeth, and the remainder of the heads seated in the countersinks of the plates, as set forth and shown.

5. In combination with the harrow-frame and spring-teeth, plates placed astride the  
 65 shanks of the teeth and against the harrow-frame, and provided with square bolt-holes at the edges of said shanks, and with openings over the shanks and adjacent to one side of the bolt-holes, and formed with concavo-con-  
 70 vex countersinks around the remainder of the bolt-holes, and tie-bolts having square necks extending through the bolt-holes, straight right-angled shoulders on one side adjacent to said necks, and convex shoulders at the oppo-  
 75 site side, substantially in the manner described and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Bath, in the  
 80 county of Steuben, in the State of New York, this 9th day of May, 1885.

FRANKLIN J. MARSHAL. [L. S.]

Witnesses:

LUCIUS A. WALDO,  
 FRANK CAMPBELL.