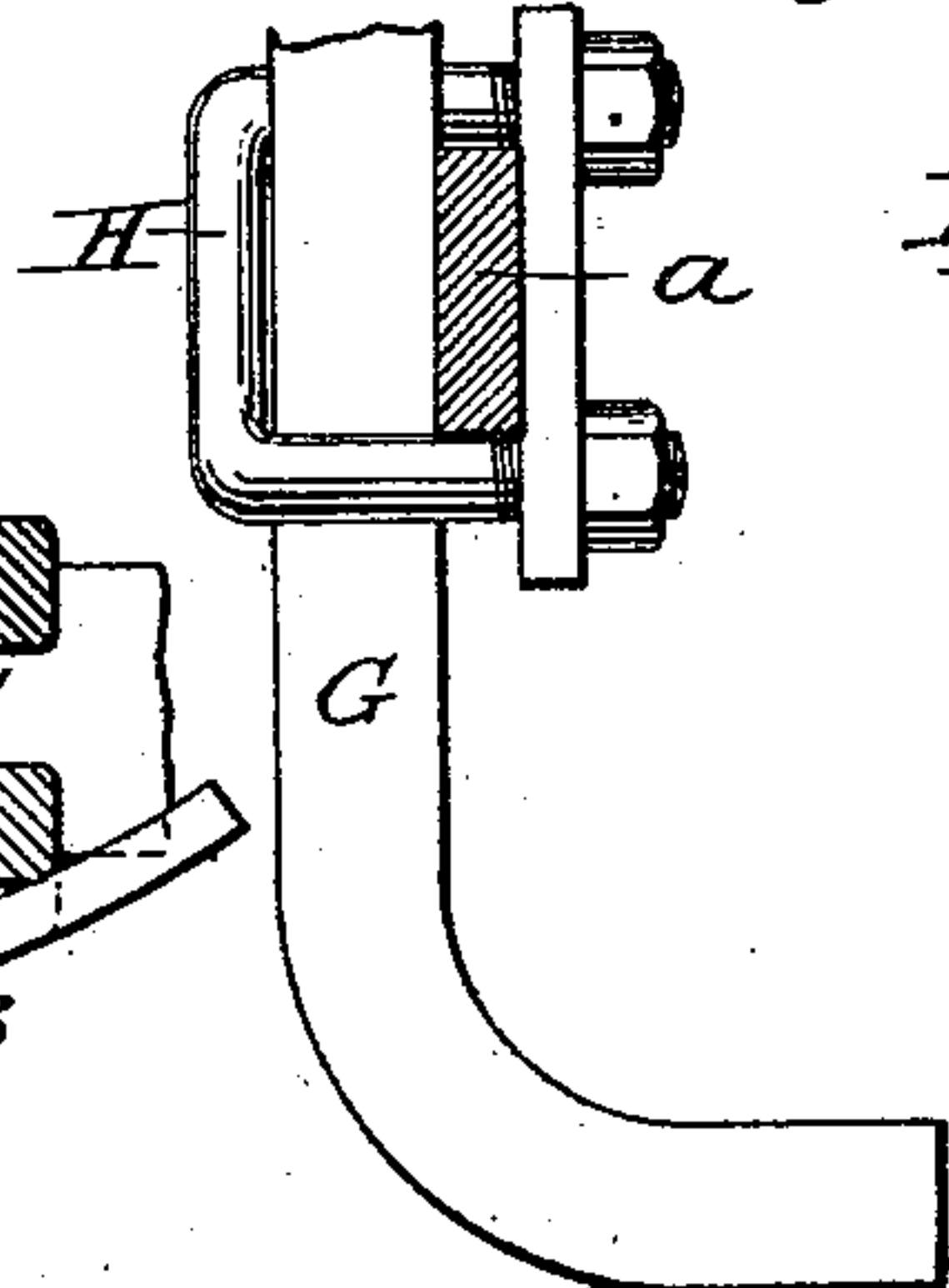
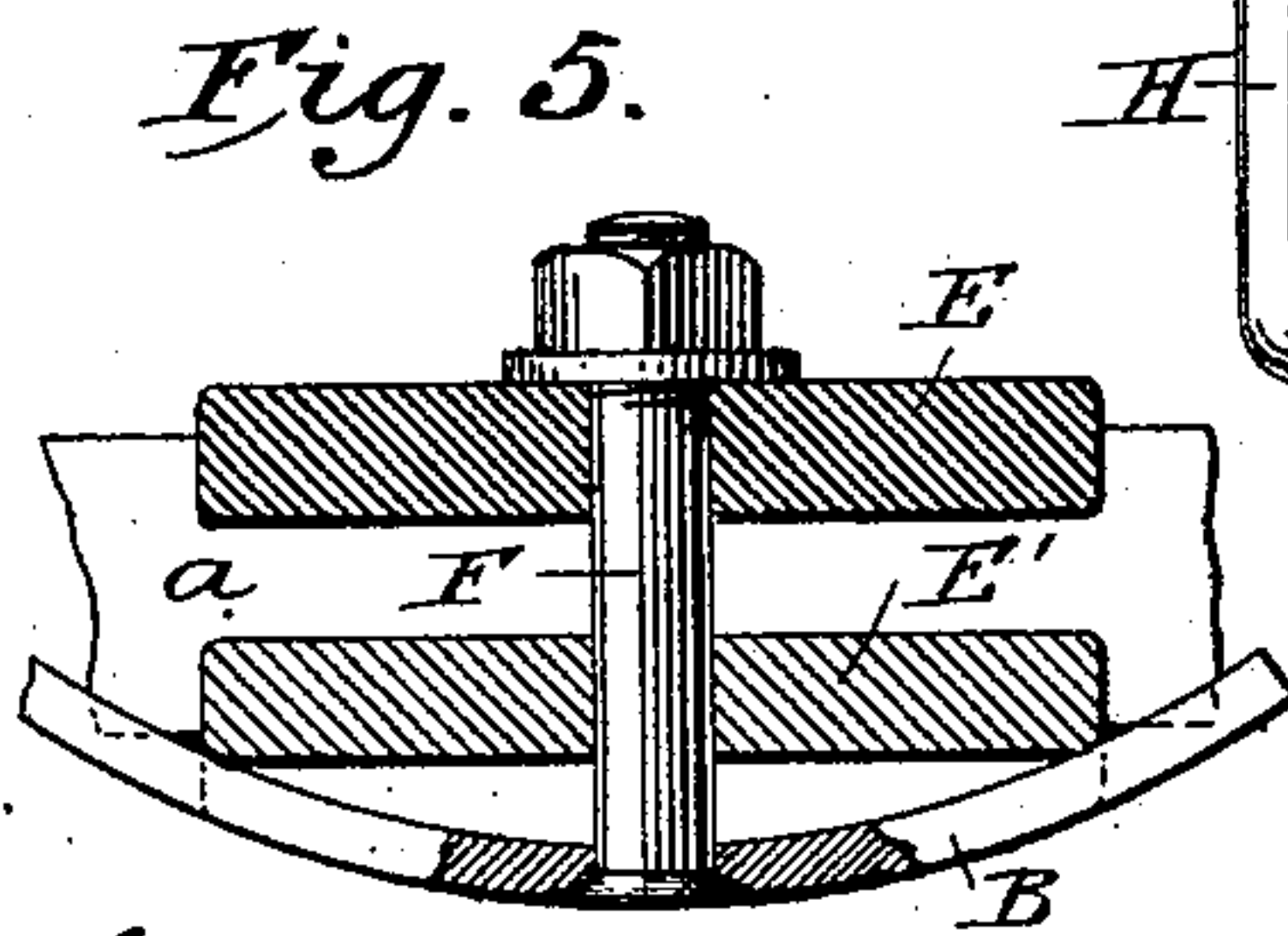
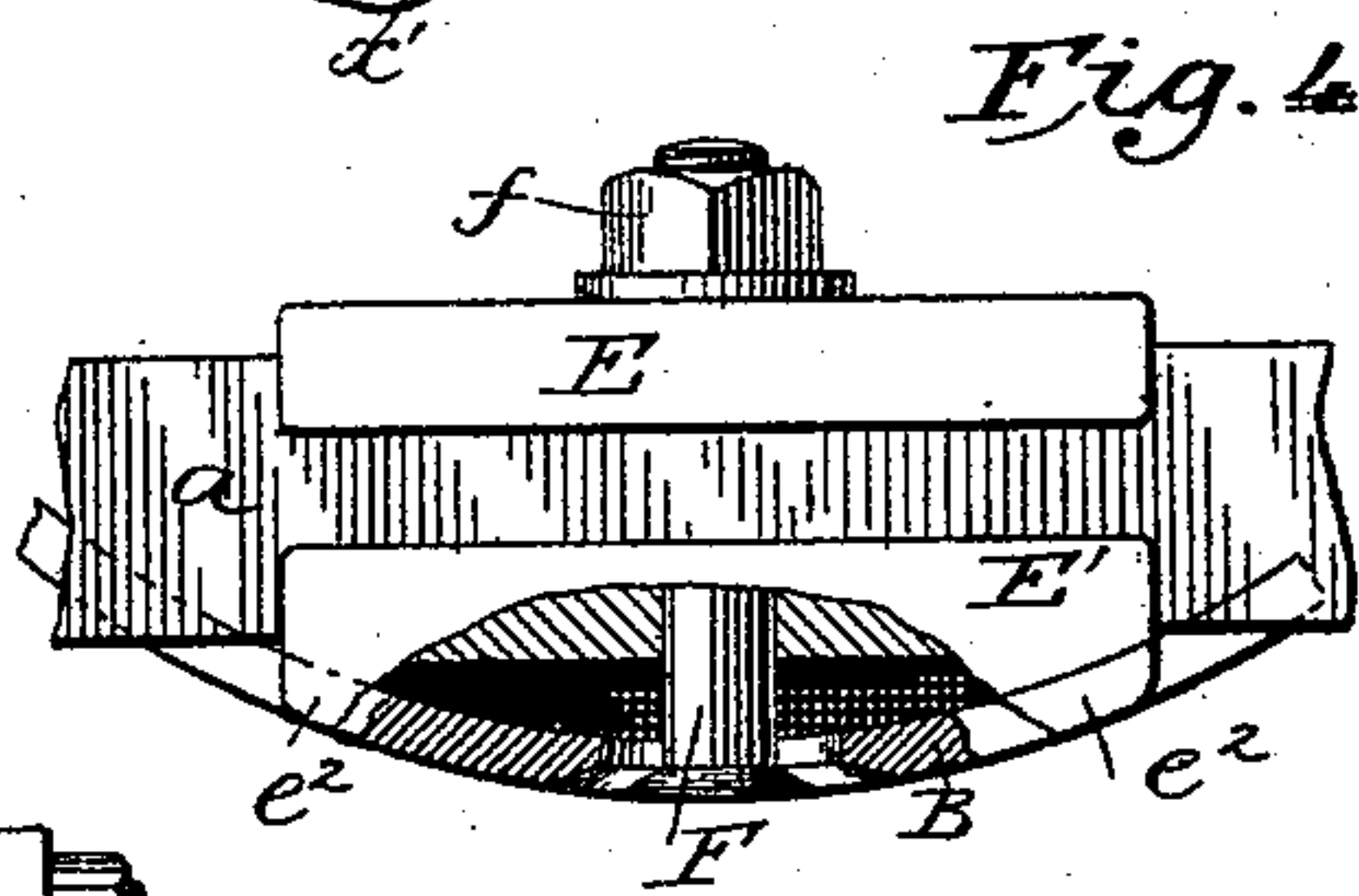
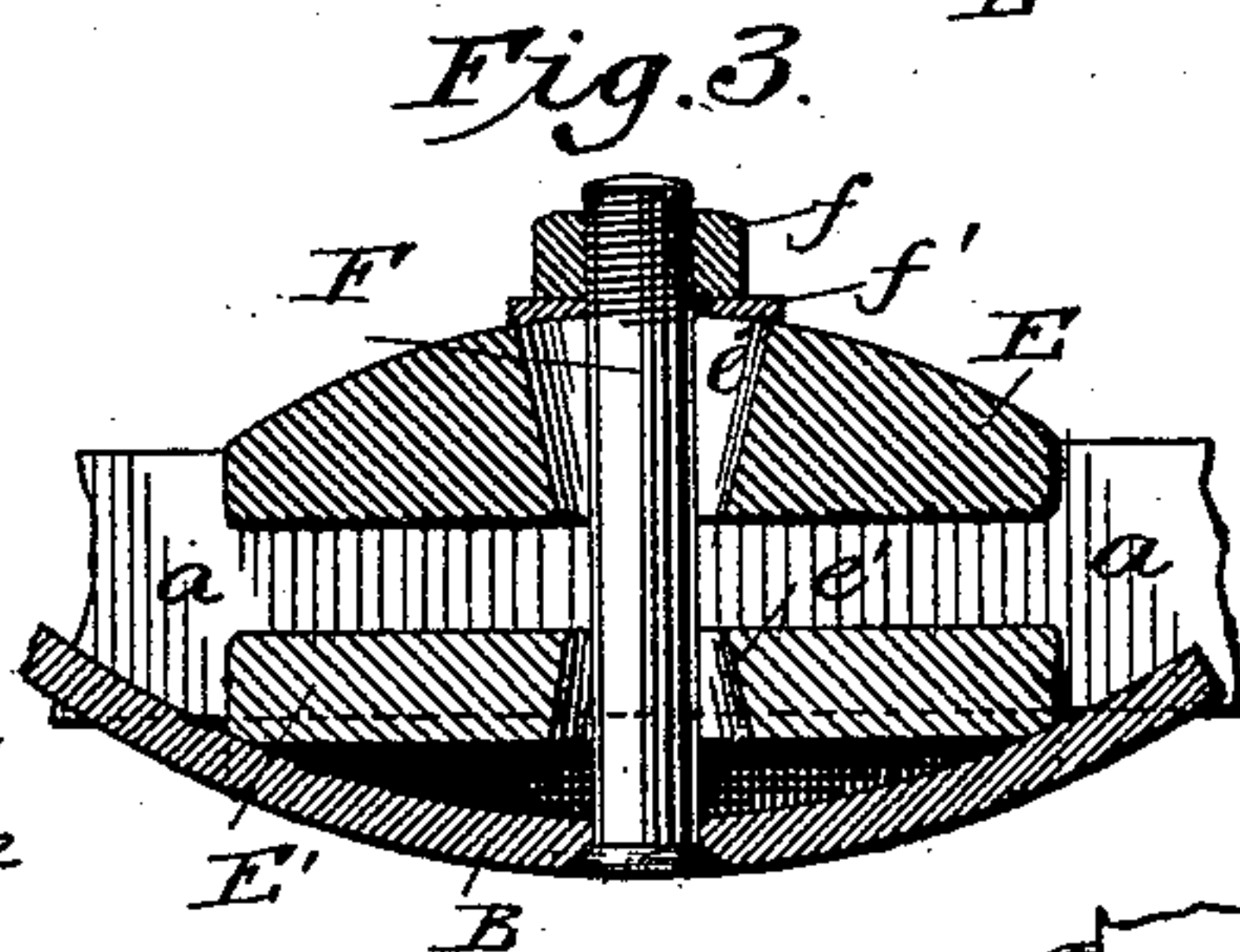
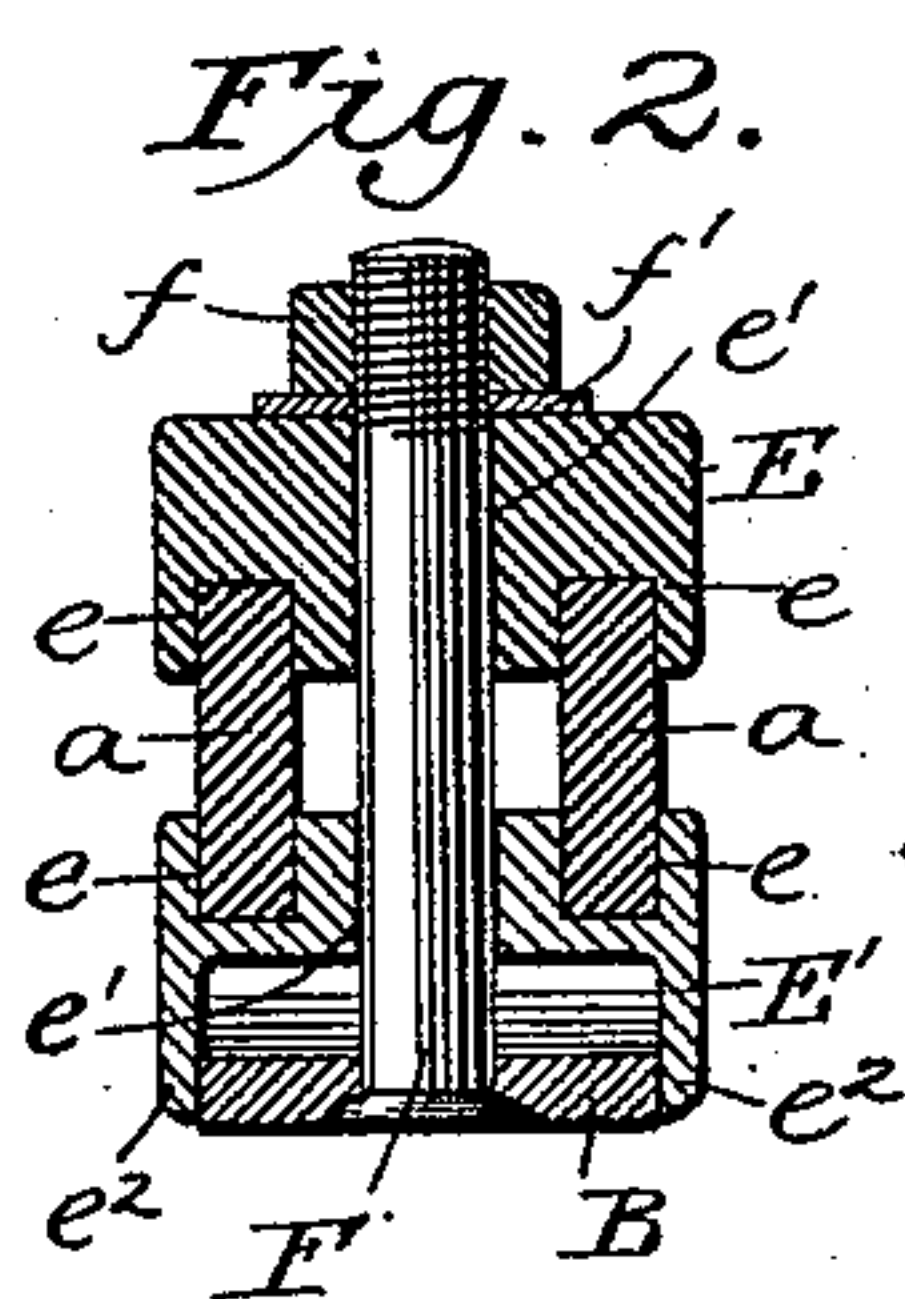
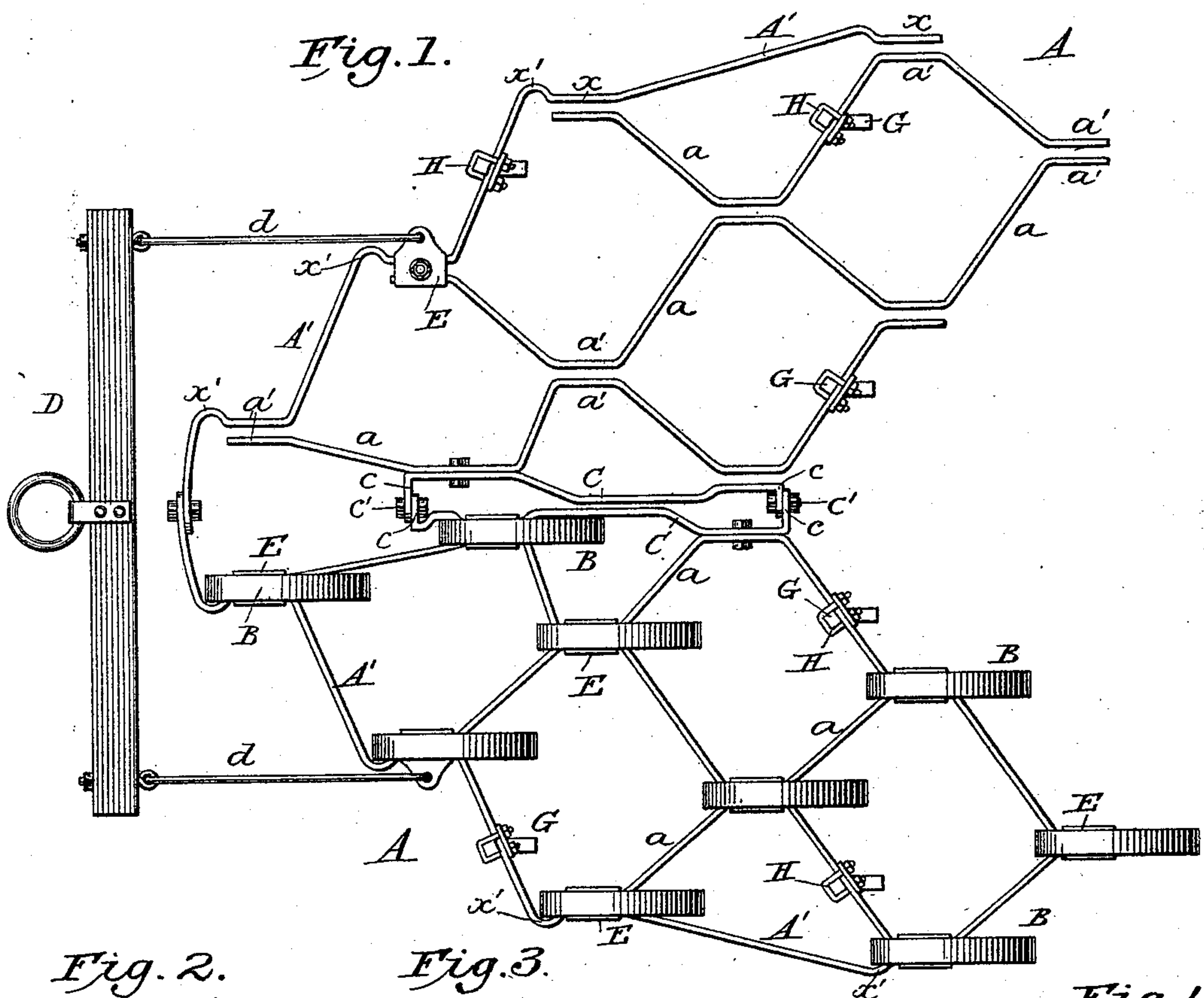


(No Model.)

C. LA DOW.  
HARROW.

No. 455,262.

Patented June 30, 1891.



Witnesses.

*Simey P. Hollingsworth*  
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# UNITED STATES PATENT OFFICE.

CHARLES LA DOW, OF ALBANY, NEW YORK.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 455,262, dated June 30, 1891.

Application filed April 11, 1891. Serial No. 388,618. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES LA DOW, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Harrows, of which the following is a specification.

In my harrow zigzag frame-bars are connected together to form a rigid section, two sections preferably being employed which are hinged together. A series of spring-teeth is carried by each section and these teeth are mounted in tooth-seats which are secured to the frame-bars by bolts. Preferably I employ tooth-seats, each formed in two parts, and the bolts serve to draw the two parts of the tooth-seats together to hold the teeth in place. Imperforate frame-bars may be employed and the tooth-seats may be so formed as to connect the bars and hold the teeth, the bolts serving to lock the parts in position. Frame guard-bars of an improved construction are provided for the front and side edges of the frame to protect the front ends of the interior frame-bars and to give strength and rigidity to the frame. The portions of these guard-bars adjacent to the tooth-seats are bent or curved laterally to form recesses or offsets into which the teeth may project. Without such recesses or offsets the teeth could not be conveniently mounted at the edges of the frame.

The details of my invention and one way of embodying it will be hereinafter more fully explained. The subject-matter deemed novel is set forth in the claims.

In the accompanying drawings, Figure 1 is a plan view of a harrow embodying my invention with the teeth in one-half of the frame removed. Fig. 2 is a transverse section through two frame-bars, a tooth, and a tooth-seat for connecting the tooth to the bars. Fig. 3 is a detail view showing the same matter in longitudinal section. Fig. 4 is a detail view of a modified form of tooth-seat. Fig. 5 is a detail view of a further modification. Fig. 6 is a detail view of one of the runners and the devices for connecting it to the frame. Figs. 2 to 6, inclusive, are all on an enlarged scale.

It will be observed that I have shown in the

drawings several ways of attaching the teeth to the frame. Others might be illustrated. It will therefore be understood that I do not limit myself to any one of the ways shown, but consider as within the scope of my invention any tooth-seat adapted to receive and hold a spring harrow-tooth and to secure it to a zigzag bar by a bolt.

I will now describe in detail my invention as illustrated in the drawings.

In general outline the harrow-frame is somewhat heart or V shaped, and consists of two sections A, hinged together. Each section is composed of bars *a*, of staggered or zigzag shape, and all the bars are rigidly connected together in each section. At the angles or bends of the bars, as well as at their ends, there are longitudinal portions *a'*, which are parallel, or substantially so, with the draft-line, and longitudinal openings are left between these longitudinal portions. The longitudinal portions *a'* of each bar are adjacent to similar portions of another bar. The teeth B are attached to the frame at the longitudinal portions *a'* in the manner hereinafter described. Each section A is in this instance shown as composed of three staggered or zigzag bars *a* and an outside or guard bar *A'*. This bar extends along the side and front of the section A, and is provided with longitudinal portions *x*, corresponding with the longitudinal portions *a'* at the edge of the interior frame-bars. The front end of the bar *A'* is bent transversely and extends to about the central draft-line, where it connects with the corresponding bar *A'* on the opposite side of the harrow.

In front of the longitudinal portions *x* of the bar *A'* and in front of the corresponding longitudinal portions *a'* of the interior frame-bars the bar *A* is provided with lateral offsets *x'* to form recesses to accommodate the front upper curved portions of the teeth B. As will be seen by reference to Fig. 2, the width of the tooth is such as to extend beyond the frame-bars, and unless these recesses were provided the teeth could not be properly seated at the edges of the frame. The frame-bars are shown as of a rectangular cross-section, their depth or height being greater than their width; but obviously frame-bars of any other



cross-section may be employed. At the inner edge of each section a short longitudinal bar C is bolted. Each of them has at front and rear lateral inward projections *c*, overlapping each other and bolted together by horizontal hinge-bolts *c'*, and upon the hinge thus formed the harrow may be folded for transportation.

The whiffletree D is shown as connected by draft-links *d* to perforated ears formed on the two tooth-seats on opposite sides of the frame near the front.

I will now describe different ways of connecting the teeth to the frame, special reference being made to Figs. 2 to 5, inclusive, of the drawings. The teeth B, as shown, are of the Garner type, having curved shanks, and they are located in series of transverse rows across the draft-line. The tooth-seat shown in Figs. 2 and 3 of the drawings consists of an upper and lower block or casting E E' of the same length, and about the same length as the longitudinal portions *a'* and *x* of the frame-bars, so that when in place the tooth-seats are held against longitudinal movement by the inclined portions of the zigzag bars. The upper block or casting E is formed with two parallel grooves or recesses *e*, adapted to fit over the longitudinal portions of the frame-bars, and with a central perforation *e'*, through which the securing-bolt F extends. The upper face or top of the block E is curved and the opening *e'* is elongated longitudinally and flared, as shown in Fig. 3, from the inner end outwardly to permit the bolt to move or swing longitudinally to adjust the tooth. The lower block E' is also provided with grooves or recesses *e* for the frame-bars and with a perforation *e'* for the bolt F. The perforation in the block E' is also flared from its inner end outwardly to permit the longitudinal or swinging movement of the bolt in adjusting the tooth. Downwardly-projecting flanges *e<sup>2</sup>* are formed on the block E', and the recess between these flanges receives the front curved end of the tooth B. The inner face of the recess is straight or flat and the tooth touches the block F at two points—viz., the front and rear ends. By this arrangement a vacant space is left between the tooth and the block, and when the bolt is tightened the tooth may be straightened out or drawn in against the spring tension, and this spring tension will then tend to draw the bolt downwardly in an opposite direction to that produced by the nut. The lower end of the bolt is headed and countersunk in the tooth, so as to present a smooth under surface. Between the nut *f* and the top of the block or casting E is interposed a washer *f'*, which is formed with a curved under face of the same radius as the curved upper face of the block, so that when the bolt is shifted or swung longitudinally the washer will always have an extended surface bearing on the block, and the upper

face of the washer will in like manner have an extended surface bearing on the nut. A very tight connection between the teeth and the frame-bars is thus afforded.

The teeth may be quickly adjusted and a slight or great degree of adjustment may be made, and as the curved inner end of the tooth is drawn inwardly when the bolt is tightened and tends to move back to its normal position a spring tension is exerted on the tooth between the points where it rests in its seat, so that the tooth is held in its seat by a spring tension, and therefore will not work loose. In this connection I desire to refer to my patent, No. 233,777, of October 26, 1880, in which I have shown and claimed a flat tooth-seat with the curved elastic inner end of the tooth held in its seat in substantially the same way as that shown in the accompanying drawings and above described.

The tooth-seat shown in Fig. 4 is substantially the same as that shown in Figs. 2 and 3, the only difference being that instead of forming flared perforations in the tooth-seats I form straight perforations, which are large enough only for the passage of the bolt, and the tooth is provided with a longitudinally-elongated opening or slot. The upper block in this instance is formed with a straight upper face, as it is not necessary to move the bolt longitudinally. In this construction the tooth is adjusted by loosening the bolt and moving the tooth longitudinally to the desired point, when it is again clamped and firmly held in position.

In Fig. 5 no provision is made for adjusting the teeth, the tooth-seats serving merely to connect the adjacent frame-bars together and to hold the tooth securely in a fixed position. The runners G are arranged at suitable intervals apart in the frame.

In the drawings I have shown six runners, two attached to the guard-bars A' toward the front of the frame and four in a transverse line across the frame near the rear end thereof. The form of the runners is immaterial and any desired shape may be employed. I have shown them as square in cross-section, and they are connected to the frame-bars by clips H. Preferably I connect the runners to the inclined portions of the frame-bars in such manner that they may be moved to any desired position between the adjacent longitudinal portions *a'* of the same bar, by which arrangement the runner may be adjusted both longitudinally and transversely at the same time, and any desired vertical adjustment may be readily made by simply unclamping, adjusting, and tightening up the clip. The transverse adjustment of the runners on the frame-bars enables the jointed harrow sections to be so balanced on the runners that the sections will always run level.

So far as I am aware I am the first to attach spring-teeth to zigzag frame-bars connected together to form a rigid section by



tooth-seats and bolts. I am also the first, so far as I am aware, to secure curved spring harrow-teeth to the longitudinal portions of imperforate zigzag bars by tooth-seats and bolts, and also to provide a harrow-frame made up of zigzag bars with guard-bars arranged at the front edges of the frame and provided with offsets or recesses for the upper curved portions of the teeth.

10 I claim as my invention—

1. In a harrow, zigzag frame-bars connected together to form a rigid section, a series of spring-teeth with curved shanks carried by the section, a series of tooth-seats, and bolts for securing the tooth-seats to the frame-bars.

2. In a harrow, zigzag frame-bars connected together to form a rigid section, a series of spring-teeth carried by the section, a series of tooth-seats, each made in two parts, and bolts

for drawing the parts of the tooth-seats toward each other.

3. In a harrow, imperforate zigzag frame-bars, spring harrow-teeth with curved shanks carried by the longitudinal portions of the bends of the bars, tooth-seats, and bolts for connecting the tooth-seats and teeth to the bars.

4. The combination of zigzag frame-bars, curved harrow-teeth connected thereto, and guard-bars arranged at the front edges of the frame and provided with offsets or recesses for the upper curved portions of the teeth.

In testimony whereof I have hereunto subscribed my name.

CHARLES LA DOW.

Witnesses:

B. W. MILLER,  
LLOYD B. WIGHT.